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STRAY LEAVES FROM A
PHYSICIAN'S PORTFOLIO

B U R N S

From a New Point of View

BY

SIR JAMES CRICHTON-BROWNE

“An entirely new light on the poet’s life and character . . . this profoundly interesting and important study.”—*Daily Telegraph*.

“Sir James Crichton-Browne’s book is as excellent on the literary as on the scientific side.”—*Scotsman*.

“All Scotsmen and all lovers of Burns owe a deep debt of gratitude to Sir James Crichton-Browne.” — WILLIAM BROWN, Esq., M.P., late High Commissioner to the Church of Scotland.

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STRAY LEAVES FROM A PHYSICIAN'S PORTFOLIO

BY

JAMES CRICHTON-BROWNE

M.D., LL.D., F.R.S.

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TO AUDREY

PREFACE

MOST physicians are peripatetics and stroll from time to time from the professional Lyceum into the shady walks that branch out of it in so many directions. In such excursions I have freely indulged, and the records of a few of them are here collected.

I cannot plead that it is the persuasions of friends that have induced me to publish or republish these heterogeneous essays and addresses. Nothing of the kind. They survive because of my personal concern that they should be rescued from the oblivion of bygone magazines and from crumbling in the domestic muniment chest of discarded papers, together with the impression—well- or ill-founded—that some of them may contain something worthy of remembrance. Their preparation has given occupation in leisure hours and relaxation amidst anxious duties, and it is hoped that their perusal may interest their readers.

I am indebted to the courtesy of the editor of the *Contemporary Review* for permission to make use of the articles on “Hamlet and Lammermoor,” to the editor

of the *National Review* for a like favour in regard to the articles on “Claret in Scotland” and “Shakespeare in Scotland,” and to the editors of the *Fortnightly Review* and *Cornhill Magazine* respectively for allowing me to reproduce the articles on “Branwell Brontë” and “Lives o’ Men.”

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DREAMY MENTAL STATES¹

DREAMY mental states, voluminous mental states, as they have been also called, are of interest from a medical, a psychological and a philosophical point of view.

The simplest form of these dreamy mental states—a sense of Reminiscence it has been called by some, a sense of Prescience by others—and the application to it of such apparently contradictory names suggests that it is somewhat mysterious in nature and difficult of interpretation—is to be found described vaguely, but recognisably, in the writings of many of our most gifted authors. It consists in an impression suddenly taking possession of the mind that the passing moment of life has been lived once before—or must be lived once again—that surrounding objects have been seen once before, or must be seen again exactly as they, at the instant, present themselves.

“How often,” says Sir Walter Scott, in *Guy Mannering*, “do we find ourselves in society which we have never before met, and yet feel impressed with a mysterious, ill-defined consciousness that neither the scene nor the subject is entirely new; nay, we feel as if we could anticipate that part of the conversation that has not yet taken place?”

¹ The Cavendish Lecture. Delivered before the West London Medico-Chronological Society, June 30th, 1895.

“ We have all some experience,” says Charles Dickens, in *David Copperfield*, “ of a feeling which comes over us occasionally of what we are saying or doing having been done in a remote time, of our having been surrounded dim ages ago by the same faces, objects and circumstances—of our knowing perfectly well what will be said next, as if we suddenly remembered it.”

Rossetti says, in *Sudden Light*:

“ I have been here before,
 But when or how I cannot tell;
 I know the grass beyond the door,
 The keen sweet smell,
 The sighing sound, the lights around the shore.

You have been mine before,—
 How long ago I may not know:
 But just when at that swallow’s soar
 Your neck turned so,
 Some veil did fall,—I know it all of yore.”

Edward Dowden says :

“ There is a murmur in my heart I hear
 Faint, oh! so faint some air I used to sing,
 It stirs my sense and odours dim and dear,
 The meadow breezes bring.

Just this way did the quiet twilight fade
 Over the fields and happy homes of men,
 While one bird sang as now, piercing the shade,
 Long since, I know not when.”

Without multiplying illustrations of this simple dreamy mental state or illusory reminiscence as experienced by masters of the literary craft, I would point out that almost invariably when these masters have regarded

it as something more than the flotation of a submerged memory and have attempted to explain it or have speculated as to its origin, they have accepted it as a vestige of a previous state of existence, or an echo from a life anterior to the present one. The thought that is of the essence of the state is transient and vanishes before it can be grasped; it is often connected with circumstances of the most commonplace or trivial description,—Oliver Wendell Holmes says it used to occur to a poor student when he was blacking his boots—and yet it startles, as if it were a flash of revelation, and leaves behind it a sense of mystery and doubt. Those who are visited by it feel that it is no ordinary remembrance or *error loci*, no mere poetical fancy, but a weird identification of the present with the past; and it is little wonder that they should translate the perplexity which accompanies it into ghostly glamour and trace it back to prehistoric times.

“ Our birth is but a sleep and a forgetting :
The soul that rises with us, our life's star,
Hath had elsewhere its setting,
And cometh from afar :
Not in entire forgetfulness,
And not in utter nakedness,
But trailing clouds of glory do we come
From God who is our home.”

Thus Wordsworth wrote, and it is to the cloudy remnants which may, according to him, be detected in infancy that dreamy states in adults have been most commonly referred. Coleridge, who was very subject to dreamy states of all sorts and sizes, seems to have

been disposed to take this view of their hidden meaning, for he said :

“ Oft o’er my brain does that strange fancy roll,
 Which makes the present, while the flash doth last,
 Seem a mere semblance of some unknown past
 Mixed with such feelings as perplex the soul
 Self-questioned in its sleep; and some have said
 We lived ere yet this robe of flesh we wore.”

Russell Lowell was evidently of the same way of thinking, for he said :

“ And now sometimes we seem to find,
 In a dark crevice of the mind,
 Some relic which long pondered o’er,
 Hints faintly at a life before.”

Coventry Patmore, too, dealing with the same topic, arrives at the same conclusion set forth in these words :

“ At times some link of harmony seems missing, and we anon,
 Remember states long ended ere we left the womb,
 And see an awful something flashing to us from the tomb,
 The zodiac light of new states dashed tremendously with gloom.
 We tremble for an instant, and a single instant more,
 Brings absolute oblivion and we push on as before.”

It is not at all improbable that the doctrine of human pre-existence owed its origin to unaccountable reminiscences of the kind alluded to in the passages quoted. To imaginative minds they may have seemed to afford glimpses of real insight into an otherwise impenetrable past, and even to matter-of-fact folks it must be admitted they sometimes bring with them suggestions of metempsychosis which it is difficult to shake off. A less transcendental view of them has diagnosed them, not

as intimations of immortality, but as revivals of hereditarily transmitted or acquired states in new and special combinations.

Dreamy states of the type described have been supposed to be generally prevalent. It has been assumed that they are an almost universal human adjunct. Dickens says we have all had them, and the usual introduction to any reference to them is that they are a feeling with which everybody is familiar. "Everybody is familiar," says Hardy in *A Pair of Blue Eyes*, "with those strange sensations we sometimes have, that our life for the moment exists in duplicate, that we have lived through that moment before or shall again." No doubt these dreamy states are frequent amongst us at the present day, but it will be found on inquiry that they are by no means all-embracing, and that while they abound amongst the educated, the refined and the neurotic, they are comparatively rare amongst the unlettered and prosaic masses of our people. The difficulty of getting information about these states is considerable, for those who have experienced them generally manifest a disinclination to talk about them, from a not unwarrantable suspicion that they are somehow uncanny in their nature or savour of lunacy, and those who have not experienced them cannot comprehend what they mean, and often treat questions bearing on them with a levity like that of the young American who, when interrogated respecting them, replied that he had never lighted a cheroot without the deepest conviction that he had done the very same thing many times

before. Still a little careful investigation as to their distribution will conduct to the conclusion that dreamy mental states, although widespread, are by no means universal and cannot, in any case, with propriety be called normal phenomena. The fact is that they are experienced only at a certain stage of mental evolution, rarely occurring in a child under eight years of age or in a man or woman of merely average intelligence and sensibility, often vexing adolescence and vanishing in adult life. They are no part of the evolutionary mental process, but one of the accidents by which it is attended. They do not present themselves before the stage of intellectual growth, at which the capability of entertaining abstract ideas is attained, and they find no place in a scheme of natural mental expansion, but are a temporary interference with the chiaroscuro of the mind. Even in their simplest forms and occurring in otherwise healthy persons, they are a deviation from the standard of health, and involve a slightly raised activity of certain nervous arrangements with loss of control in others. Shifting and transient they may be, like cramp of a few fibres of a muscle, but they betoken instability in some corner of the brain—a defect of consciousness in one direction.

But it is in dreamy mental states, not of the merely reminiscent and superficial order, but in those of a deeper and more pronounced type, that mental perturbation and nerve-disorder or storm are revealed in such a way that the study of them might throw light on some obscure psychical problems. They are, as it were, rents in conscious life through which glimpses of the supra-

conscious may be obtained. The description most generally given by those who experience them is that they are indescribable. Exceedingly diverse in character, they are almost invariably concerned with those ultimate ideas—space, time, matter, motion or relativity—which are beyond the domain of certain knowledge and, according to Herbert Spencer, unthinkable. Contrary to all experience, they have apparently the highest experiential validity. They declare themselves now as tamperings with those intuitions that yield the consciousness of continued existence, and again as excursions into that infinite field that lies behind appearances and of which it is dangerous to affirm or deny anything. Plunges they are into these depths of mystery in which the certitudes of science lose themselves and out of which, it has been said, the certitudes of faith arise. Momentary realisations they become of Nirvana or the cessation of personal being or foretastes of purgatorial pains more searching than any that Dante conceived. “Dream not, Coleridge,” Charles Lamb wrote, “of having tasted the grandeur and wildness of fancy till you have gone mad.” “Think not, Lamb,” Coleridge might have replied, “of having touched the skirts of immensity and mystery until you have had a dreamy mental state.” The subjects of pronounced dreamy mental states, striving to convey some notion of them, tell us that they consist in a feeling of being somewhere else—in double consciousness—in a loss of personal identity—in supernatural joyousness or profound despair—in losing touch of the world—in a

deprivation of corporeal substance—in a loss of the sense of proportion—in being at the Day of Judgment—in a sense of vastness and vacuity or of collapse and nothingness, in which the spirit realises the unreality of the material universe and asks itself who, where and what it is. Almost all who have knowledge of them supplement whatever nebulous phrases they may use with the assurance that it is impossible to put into words such strange and incomprehensible visitations.

That dreamy mental states of the severe and awe-inspiring kind are often the outcome of those of a simpler and more innocent nature, and that both have a certain pathological significance, is demonstrable. The transition of the one into the other or their association in the same person may often be clearly traced out. Thus in Tennyson's writings we have references to what may be called the ordinary dreamy mental state. In *The Two Voices* he says :

“ Moreover, something is or seems,
That touches me with mystic gleams,
Like glimpses of forgotten dreams—

Of something felt, like something here ;
Of something done I know not where ;
Such as no language may declare.”

and in the *Early Sonnets* he thus delivers himself:

“ As when with downcast eyes we muse and brood,
And ebb into a former life or seem,
To lapse far back in some confused dream
To states of mystical similitude ;

If one but speaks or hems or stirs his chair,
Ever the wonder waxeth more and more,
So that we say, ' All this hath been before,
All this has been I know not when or where.' ”

But in Tennyson's writings we have also references to other dreamy mental states which have about them quite as convincing a ring of personal knowledge and the morbidity of which can scarcely be questioned. Thus in *The Princess* we are told that the hero, who belonged to a race haunted by a hereditary nervous affection, was himself afflicted by—

“ . . . weird seizures, Heaven knows what :
On a sudden in the midst of men and day,
And while I walked and talked as heretofore,
I seemed to move among a world of ghosts,
And feel myself the shadow of a dream.”

In these words it is not difficult to recognise an outline of *petit mal*, and Tennyson himself names these seizures epilepsy. We have therefore in his poetry appreciations of a simple dreamy mental state, of a more serious kind and of a dreamy mentality bordering on epilepsy of which these dreamy mental states are sometimes the prelude or accompaniment. It is clear that his poetical allusions to both kinds of dreamy mental states were founded on his personal experiences. He was from early years subject to “ weird seizures,” which he has thus described : “ A kind of waking trance I have frequently had, up from boyhood, when I have been all alone. This has generally come upon me through repeating my own name two or three times to myself, till all at once, as it were, out of the intensity of the

consciousness of individuality, the individuality itself seemed to dissolve and fade away into boundless being, and this not in a confused state but clearest of the clear, the surest of the sure, the weirdest of the weird, utterly beyond words, where death was an almost laughable impossibility, the loss of personality (if so it were) seeming no extinction but the only true life. . . . This might be the state which St. Paul describes ‘whether in the body I cannot tell or whether out of the body I cannot tell.’ I am ashamed of my feeble description. Have I not said the state is utterly beyond words? But in a moment when I come back to my normal state of sanity I am ready to fight for *mein liebe Ich* and hold that it will last for æons and æons.”

Wordsworth, as has been pointed out, showed in the *Intimations of Immortality* his acquaintance with the simple dreamy mental state corresponding with the belief that what is now has been once before, but he too, like Tennyson, experienced more advanced and unhealthy stages of the same mental condition. He tells us of—

“ . . . those obstinate questionings,
Of sense and outward things,
Fallings from us, vanishings,
Blank misgivings of a creature
Moving about in worlds not realised.
High instincts before which our mortal Nature
Did tremble like a guilty thing surprised.”

lines which betray some loss of touch with reality, some incomprehensible glimpse of things invisible, accompanied by the terror which such a glimpse brings with

it. Writing to Miss Fenwick in 1843, Wordsworth said: "Many times when going to school have I grasped at a wall or tree to recall myself from the abyss of idealism to the reality."

Tolstoy, who ultimately presented all the stigmata of nervous degeneration, had seizures akin to those of Tennyson and Wordsworth. "Scepticism," he wrote, "brought me at one time to a condition bordering on frenzy. I had the idea that besides myself nobody and nothing existed in the whole world, that things were not things, but presentations which only became phenomenal at what time I directed my attention to them, and that these presentations disappeared at once when I ceased to think of them. There were hours when under the influence of this fixed idea I came to such a pitch of mental bewilderment, that I at times looked quickly the other way in the hope that, in the place where I was not, I might be surprised by nothingness." That Tolstoy was aware of the morbid nature of these states is evident, for he says in his *Confessions*, "I felt that I was not quite mentally sound."

Dreamy mental states of the elaborate kind experienced by Tennyson, Wordsworth and Tolstoy are occasionally said to be pleasurable and to consist in ecstasies of wonder and delight, but as a rule they are accompanied by terror and alarm. Kinglake, in *Eothen*, recalling seizures that came upon him when five years old, in which he lay in his bed conscious, oppressed by "the abstract idea of solid immensity," says he suffered "agonies of horror," and Berlioz in his

account of what he calls his "*mal de l'isolement*," says that during the attacks he suffered frightfully, lying on the ground groaning, stretching out his arms, tearing up handfuls of grass and innocent daisies, fighting with "this *absence*, this horrible isolation!"

A dreamy mental state of one kind or another is not rarely the introduction to an epileptic fit and in that case is designated an intellectual *aura* or warning. It is not suggested that the dreamy mental state is under such circumstances directly due to the epileptic discharge, but there are grounds for holding that it depends on the heightened activity and increased energising of nervous arrangements intimately linked with those in which the true epileptic discharge begins. A truly epileptic or sudden and excessive discharge of the highest nervous arrangements results, not in ideas however vague, but in the negation of thought or loss of consciousness and ideas properly so called attend the excitation and not the explosive discharge of these arrangements. Intellectual *auræ* are therefore precursors and not integral parts of epileptic fits. A medical man of great eminence who a number of years ago contributed to the *Practitioner* an interesting memoir of his own case said that he had suffered from boyhood from dreamy mental states of reminiscence, or a startling conviction that he had once before been placed in the exact circumstances in which he found himself, and that immediately before his first epileptic fit, which occurred in middle life, these dreamy states recurred with unusual frequency and intensity. "Since my first attack," he

went on, " I have only had few recurrences of the feeling, but on two occasions these were followed the next day by a seizure." A patient of Dr. Hughlings Jackson reported that his fits began by " a sort of referring to old things that have happened," after which he lost himself; another intimated that old scenes reverted for hours before the fit; another said, " If I were walking along and had a fit I should think, ' Oh! I saw that before,' " and a patient of my own, before each attack, had a similar impression, accompanied by intense terror and anxiety. Dr. Joseph Coates, of Glasgow, has narrated the case of an intelligent man who stated that with few exceptions his fits had been preceded by giddiness and " a peculiar thought," as he expressed it. He attached great importance to this " thought," saying that if it were known his whole case would be explained, and although he could not tell what the thought was, he was confident that it was always the same. He always recognised it when it occurred and tried to fix it in his memory, but he invariably forgot it when the fit was over.

Now this case of Dr. Coates, and another case in which " a dreadful queer feeling " which gave notice of fits when they first commenced, but was gradually lost as they became confirmed and severe, suggest that dreamy mental states perhaps immediately prelude epileptic fits more frequently than the testimony of those who suffer from such fits would lead us to suppose, for it is undoubtedly true that when consciousness is suddenly interrupted there is often obliteration of the

records of conscious experiences for a period, longer or shorter, before the exact moment at which the interruption occurred. The impressions received on the sensitive plate of the brain and the ideas developed can only apparently be fixed there so as to be capable of reproduction while conscious activity is maintained for a certain time after their reception, and an abrupt cessation of brain function not only arrests sensation and perception but prevents the due registration of some sensations and perceptions that have taken place immediately prior to the break in the chain of conscious life. The blackness of insensibility casts a dark shadow behind it. In cases of concussion or injury of the brain inducing coma, we frequently find that there is, after recovery, a mental blank as to incidents that occurred some time before the accident, and in cases of epileptic seizure it may often be demonstrated that events occurring a few minutes before the actual invasion of the fit or of any premonitory symptom of it—at a time when the intellect was clear and conduct rational—cannot, by any effort, be recalled after the fit is over. It may well be, therefore, that mental experiences in juxtaposition to the fit, and constituting indeed its initial symptom or warning, are irrecoverable in memory, and so the assurances of persons subject to dreamy states and epileptic fits that the former do not usher in the latter cannot be received as trustworthy.

But whatever may be the frequency of dreamy mental states as psychical *auræ* in epilepsy, I feel satisfied that the risks attending them in this connection may be

measured by the degree in which an emotional element enters into them, or in which they tend to pass over into action. These states that are colourless or agreeable are comparatively innocent and may recur for years without harmful consequences, whereas those that are attended by fear, pangs, anguish, horror or visceral disturbances are peculiarly apt to lead up to other nervous troubles. Many cases have been noted in which dreamy mental states mingled with fear have ultimately merged in epilepsy, and this danger seems to be peculiarly great when the fear is connected with visceral sensations, such as difficulty of breathing, oppression of the chest, palpitation of the heart or a feeling of sinking at the epigastrium. A girl who was under my care and who had suffered for years from what she called "a frightened stomach-ache," and could only further explain as a feeling of "fear at the pit of her stomach," after a time became epileptic, her fits being always immediately preceded by the "frightened stomach-ache," which lasted for about five or ten seconds, and allowed her time to give notice of the impending seizure, which she invariably did by piteously shouting out, "Bump my back!" If before the actual appearance of convulsive spasms anyone could reach her and obey her mandate by giving her four or five smart blows over the twelfth dorsal vertebra the fit was very frequently averted. Another girl under treatment at the same time, who before becoming epileptic had been subject to slight fainting feelings, accompanied by the dread of being killed, gave notice of her attacks by crying

out, the instant before she dropped, the words "Dangers and bolsters!" which were understood to convey an announcement of the revival of her old apprehension and the expression of a wish that a pillow might be brought on which to rest her head.

In many cases of epilepsy that have been associated with dreamy mental states, the infusion in these states of a feeling of fear and of obscure visceral sensations may be made out; visceral sensations in this connection being more frequent than crude sensations of coloured vision, or noises in the ears, or more elaborate sensations of spectral faces, or hearing voices.

There is an obvious affinity between dreamy mental states and megrim or sick headache. They both depend on some morbid tendency or condition of the encephalon, manifested in paroxysmal disturbances which, however, traverse different tracks in the encephalon, that of megrim originating in the part of the sensorium concerned in sight and pursuing a sensory track. In megrim there is almost invariably a family predisposition. The attacks begin at about ten or eleven years of age and abate at from twenty to thirty. They are induced by emotional excitement, shock or fatigue, and range from slight hemicrania with half vision and giddiness up to a complex assemblage of phenomena, including luminous fortification outlines, subjective tactile sensations, numbness of the limbs, disorders of ideation, stupor and speechlessness. In rare instances megrim and dreamy mental states merge, as it were, into each other. A medical man after reading Dr. Hubert

Airy's paper on *Transient Hemiopia* described what he regarded as the most striking feature of his megrim seizure. After the visceral phenomena passed, he experienced a peculiar mental change. Circumstances and events that had occurred long before were brought back to him as if actually present, his consciousness appeared to be doubled, and the past and present were confounded.

But not less ominous than visceral sensations in connection with dreamy states are actions which are repeated whenever these states recur, for these indicate a deepening or diffusion of the cerebral disturbance which makes it correspond with somnambulism rather than with dreaming. Running movements may only betoken the dominant emotion of fear; masticatory movements, smacking of the lips and spitting, may mean a crude sensation of taste, but spasmodic movements are premonitory of convulsions. In one case which ended in epilepsy there were during these states rapid clutching movements of the hands. In dreamy mental states that are to prove harmless there is mostly tranquillity, but where muscular agitation accompanies them they are not unlikely to advance into something worse than themselves.

The morbid character in dreamy mental states is abundantly illustrated by occasional transition into epileptic seizures and by their interspersal amongst them, but this is not the only pathological transformation that they undergo, for a history of them is not rarely discoverable in those who have become insane

without the intervention of epilepsy, and the passage from them into states of mental disease may occasionally be traced out. St. Pierre, the author of the ever-fascinating *Paul and Virginia*, when overcome by disappointment and humiliation and tottering on the brink of madness, was harassed by seizures which had certainly much in common with dreamy mental states. "I was struck," he says, "with an extraordinary malady; streams of fire like lightning flashed before my eyes; every object appeared to me double or in motion. In the finest day of Summer I could not cross the Seine in a boat without experiencing intolerable anxiety. If in a public garden I merely passed a piece of water, I suffered from spasms and a sudden feeling of horror!" A patient of my own who had a sharp attack of insanity with delusions for two years before its development suffered from dreamy mental states. These first took the form of a sudden dead feeling in the head said to be both physical and mental, which came on almost every day; but after three months they assumed a new shape, a sudden sense of fear, during which all objects around him seemed to grow distant and after which there was violent palpitation of the heart. Still a third transformation took place when the sense of fear changed into a wild desire to run round in a circle and scream, and after that came mania.

But not more by their transitions than by their associations is the true character of dreamy mental states of the graver kind betrayed, for almost invariably they occur during impaired bodily health or in states of

exhaustion or have bound up with them, either in the sufferer himself or in the family to which he belongs, other and unmistakable symptoms of nervous disorder. They rarely stand alone, but have for the most part, side by side with them, other signs of a want of equilibrium in the nerve-centre. It is noteworthy that of the distinguished men of letters whose confessions of dreamy mental states have been quoted, Scott, Dickens and Rossetti died of brain disease. One of the most striking and persistent cases of dreamy mental states that I have met with was that of a gentleman whose father was epileptic, who had one brother a dipsomaniac, another a confirmed opium eater, another an epileptic, another a lunatic, and one brother and several sisters free from nervous taint. I cannot perhaps better convey some notion of the associations of dreamy mental states, personal and hereditary, than by recounting the history of a family in which I have been able to track them through four generations.

M. G., a lady who lived in the early part of the nineteenth century, was subject from girlhood to what were then called "spells of absent-mindedness," but which, seen now by the light reflected on them by the experiences of her descendants, may be safely pronounced to have been dreamy mental states. She was always nervous and peculiar, and is reported at one period of her life to have displayed insane jealousy, but she bore a family of ten children to a healthy and vigorous husband, and died at an advanced age of epilepsy,

from which she had suffered for some years, the fits being heralded by an aura in the left hand and arm; and being sometimes prevented by the firm ligature of that limb. Of M. G.'s ten children one boy died of convulsions in infancy, and one daughter of phthisis at adolescence, and two of them, a boy and a girl, manifested neurotic derangements no doubt derived from her.

T. C., a son, who became a medical man, was distressed in youth and manhood by brief seizures which may be described now as loss of orientation, but which he himself nicknamed "a topographical topsy-turvy." Generally, when out walking and alone, his consciousness of his geographical bearings became confused, and this without vertigo or apparent movement of objects to one side. In an instant the world seemed to him to have whirled round, and he could not for the life of him make out the points of the compass, although the landscape and all objects around him remained unchanged in appearance. He felt that it was a matter of pressing moment that he should recover his true position in space, and for a few seconds was in a tremor of perplexity and dread, and then, all at once, everything was righted, and he knew where he stood and said to himself with delight, "That is the North, and I know now exactly how the South and East and West lie." The seizures or bewilderments continued to annoy him, but at widening intervals until he was about forty years of age, when one day, while standing on the edge of a rock and looking at a waterfall in the Scottish Highlands, he fell suddenly in a violent epileptic fit, and was

only saved from death by the presence of mind of a companion. From that date he never again experienced loss of orientation, but he had from time to time epileptic fits, chiefly nocturnal, which did not, however, impair his intellect or health, for he died at a ripe age of Bright's disease. The sister of T. C., M. F., a woman of great intelligence and energy, was subject from girlhood up to middle age to periodical attacks of migraine with fortification outlines which may be regarded as an allotropic form of a dreamy mental state or a sensory epilepsy. She married and had eight children, one of whom died of acute hydrocephalus and two of typhoid fever. Of the five survivors, two, a son and a daughter, became the victims of dreamy mental states at about nine and ten years of age respectively, and continued to suffer from them with gradually diminishing intensity and frequency up to middle life. In these two cases the dreamy mental states were identical in nature, and although the sufferers had never compared notes about them, being somewhat ashamed of them, were described in precisely the same terms to the physician who ultimately made inquiries about them. They were called "frightened feelings" and consisted in a loss of personal identity. The son, S. E., who gave the fullest account of them, said that suddenly he lost his hold of the universe and ceased to know who he was. Everything seemed changed in a twinkling, and he lost his relations to time and space. He felt intense terror, while the attack lasted, lest he should never become himself again, and after it was over there was always violent

palpitation of the heart. He was never unconscious during the attack, which lasted ten or twelve seconds at the most, for he could pass from one room to another, or run upstairs, and voluntarily call out certain names even while it lasted. He generally called out repeatedly and in a hurried manner his own name or that of a sister who was about his own age and his constant companion, and he affirmed that the calling out of these names helped him to recover his identity. The frightened feelings almost invariably came on when he was alone, and when assailed by them he ran to seek society, as the presence of anyone drove them away. They never came on when he was engaged in conversation or in work, mental or bodily, involving effort, but always when he was ruminating or carrying on some routine employment. At one time he could bring them on by allowing himself to drift into a particular train of thought or becoming abstract and metaphysical, as he termed it. If he asked himself, "Who am I? What am I? Where do I come from? How do I stand related to persons and things around me?" he inevitably had an attack, and the very fear that he might drop into this current of speculation often irresistibly drove him into it and ended in a repetition of his sufferings. Fear of any other kind, however, or emotional excitement, never induced an attack; but he distinctly recalled that after being taken to the whispering gallery at St. Paul's, and being terrified by looking down from its height into the Cathedral below, he had several times an attack when the terrific impression he then received recurred

to him in memory and created a sense of his own insignificance. The attacks never occurred in the morning, only occasionally in the afternoon or early evening, and by far most frequently as he was undressing to go to bed. As they wore off in adult life the last vestiges of them were experienced while he was drowsy and just falling asleep. Suddenly he would spring up in bed conscious that his old terror was upon him again, though in a dim and distant way, and always after he did so there was palpitation of the heart. S. E. led an active and useful life, but his health and mental condition were, he himself thought, appreciably affected by his attacks, for he never fulfilled the intellectual promise of his boyhood; but was impulsive and irritable and suffered much from depression and general debility. His sister, N. E., whose attacks were in all respects similar to his in character, and consisted in a temporary loss of personal identity with a feeling of infinite distress, embarrassed breathing and palpitation, but less severe and frequent, was also of a highly nervous temperament and had an attack of mental depression. S. E. married and had two children, a boy and a girl, both of whom suffered from dreamy mental states and whose cases I was able to observe. The boy began at the age of ten, when fragile and delicate, to have odd and horrid feelings. They generally came on when he was in bed, but they have happened in church, and at a time when he was not apprehending them. Except in church he never had them in the presence of anyone, but always when alone. He could not explain the attacks further than

by saying that he felt as if he were “just nothing” while they lasted, and was terribly frightened, his heart beating very fast. During the continuance of the attacks, which never exceeded a few seconds, it was usual for him to touch or pinch his body and limbs with his fingers and thumb and say to himself, “Who am I? Am I alive?” It was for the most part while he was thinking deeply on “religious or out-of-the-way subjects,” as he phrased it, that the attacks came on, and occasionally he was able, on feeling one approach, by thinking to himself, “Oh, it is all nonsense, I am in a room—that is a chair and this a bed,” to ward it off; thus by a strong effort recovering his object consciousness when it began to fail. While suffering from these attacks he was disturbed by violent muscular jerks as he was falling to sleep, and on one occasion had a numb feeling followed by shaking down the left arm. He cried out for help and was found sitting up in bed and holding his left arm, which was trembling. At the same time he had a strange dream, which recurred again and again, and with which he became painfully familiar. In the beginning of the dream he felt enormously large in all dimensions, as if he were the length of the room, and swollen out so that if he moved his leg it felt like the leg of a giant. Then there came a vast haze and vacancy and great fear, and in the haze black sticks or stripes appeared all round and seemed to be closing in upon him, and then in terror he awoke.

Under the impression that they were just “silliness” and that he would be laughed at if he spoke of them, this

boy concealed his dreamy states until he was nearly fourteen years of age, when they became so severe and distressing as to make his life miserable and he was obliged to acknowledge them. He was sent to the country, freed from brain work, carefully nourished and put upon bromides, and the attacks rapidly diminished in number and severity, but up till his twentieth year he continued to suffer from them from time to time.

This boy's sister, J. E., at eight years of age began to suffer from attacks similar to his, which she also for a time kept to herself because she thought they were due to "conscience," but which were brought to light when his were revealed. They came on, she said, never when there was bustle around or when anyone was talking to her, but always when she was alone, especially when she was sitting doing nothing, looking at her dress or the floor, and she could induce them, when alone, by gazing at her hands, saying to herself it was funny that she was alive, and wondering how it was that she came into the world. "The lost or funny feelings" in her, for thus she labelled them, did not cause terror, but only uneasiness, and were not followed by any disturbance of the heart's action. They lasted only for a few seconds. Once or twice she had numbness of the left hand and transient lateral hemianopia. Like her brother, J. E. had startings on going to sleep and constantly recurring dreams, in her case of skimmings over the surface of the ground and flying down stairs. Objects at which she gazed intently sometimes grew smaller and smaller and receded into distance, and this

experience was always followed by a feeling of sleepiness for a few minutes. When just falling asleep she would often hear a low murmuring, crooning noise, as if someone were sneering at her—a sound which was horrid and created alarm, and was so real that she was obliged to jump up in bed and rub her ears. At other times when falling asleep she would have a loud dinging in her ears, and while still awake but lying with closed eyes, she often saw long, black figures which changed into little dumpy, white ones. On one occasion she saw a spectral face, and having raised herself in bed watched it grinning at her in a corner of the room and noted that it had very white teeth and red hair. J. E. was also put under treatment as soon as her dreamy states were discovered, and improved rapidly when relieved from educational pressure and carefully nourished. As the dreamy states diminished in number she became visibly happier and more animated in spirits, but she continued to suffer from them once or twice a month until she was eighteen years old, when after an attack of chlorosis they again became very troublesome. In another year, however, they again yielded to treatment, and now she is, she reports, altogether free from them.

This story of the dreamy mental states of a family is, I believe, unique in affording evidence of the hereditary transmission of these states through four generations, and it is instructive as regards their affinities. It illustrates, not merely the transmission of dreamy mental states, but of a particular dreamy mental state, and that one of a very elaborate description. The account

given of the dreamy mental state in the first generation is too indefinite to enable us to decide its real nature, and in the second generation that state had reference to ideas of space, but in the third and fourth generations and in four different individuals it consisted in a loss of personal identity. We have thus a particular aberration of mind springing up spontaneously and independently in four persons, that aberration being exactly the one which the dreamy mental state assumed in the late Lord Beaconsfield, who wrote, "I was not always assured of my identity or even existence, for I sometimes found it necessary to shout aloud to be sure that I lived, and I was in the habit very often at night of taking down a volume and looking into it for my name to be convinced that I had not been dreaming of myself."

The story also illustrates the relation of dreamy mental states to evolutionary changes in the brain. The age at which these states first occurred is recorded in four cases; it was ten in the cases of two boys and eight and nine in the cases of two girls, and it is to be remembered that at that period of life cerebral development in the female is from one to two years ahead of that in the male sex, and thus it is that the age of incidence of dreamy mental states, like that of chorea, is somewhat earlier in the female than in the male sex. In these four cases, too, the dreamy states persisted only while cerebral and mental development were going actively on and vanished when maturity was attained.

It is to be noted further in this story that in three

cases—all right-handed persons—indications were given by modifications of sensation and movement in the left arm that, along with dreamy states, there was or had been some functional derangement of the right hemisphere of the brain. Dr. Hughlings Jackson, whose guesses in neurology were more valuable and enlightening than most other men's lifelong observations and carefully reasoned conclusions, long ago suggested that in epilepsy with the dreamy state the first spasm or abnormal condition would be observed on the left side of the body corresponding with involvement of the right or more subjective of the two hemispheres of the brain, and these three cases are, as far as they go, corroborative of his view.

In two cases in this family chronicle the impression of looking from a height was apparently influential in inducing cerebral disturbances of the nature of dreamy mental states. In one case, the first epileptic fit occurred when falling water was being looked at from the edge of a precipice, and when unusual ocular movements were therefore rapidly taking place, and in the other dreamy mental states were brought on by the mere remembrance of the agitation caused by looking down from an altitude. We have all heard of these strange sensations and impulses, psychical reflexes, which have led to suicide by precipitation under such circumstances, and of the fascination which has caused bystanders to yearn to throw themselves in front of a swiftly passing train, and we may perhaps discover in these phenomena analogues of dreamy mental states. A friend of Arthur Hugh

Clough once told me that on one occasion on which the poet was visiting him in North Wales he took him for a walk and conducted him to a grassy slope terminating in a wall which formed the parapet of a huge cliff, with a sheer descent of two or three hundred feet. The wall, a rough stone one, looked simply the boundary of a field, and no one approaching it on the landward side could have any conception of what lay beyond it. The poet being brought up to the wall looked over it, and on doing so had suddenly disclosed to him the declivity, the wrinkled ocean beneath, and the circling flakes of white sea birds between, and with a very startling effect. He fell back on the grass, pale and shivering, and exclaimed: "Oh, my God! what a fearful sight!" and then turned and said to his friend: "My life seems shrivelled up before me. For Heaven's sake give me some brandy!" But there was no brandy to be had, for the nearest house was four miles off: so nothing could be done for him in his distress but to sprinkle his face with water. He lay on the grass for half an hour ghastly and sick like a man at the point of death, and it was then only with the utmost difficulty that he was helped to a farm where stimulants were procured for him. Never afterwards would he permit any conversation about that vision of the sea; he shuddered when any reference was made to it.

The late Sir Charles Dilke wrote to me: "When over-fatigued, as by hard examination work, I felt unwillingness to pass in front of the looking-glass late at night from a fear—nothing definite—of what might

be seen. What you call 'bad head,' that is, fear of high places, other than mere cowardice or fear of death or injury was very marked in my case during all the years in which there were symptoms of dreamy mental states. But I succeeded in conquering it. When intending to go to the Afghan frontier as the guest of Sir Frederick Roberts, and knowing that I should have to ride along narrow paths over precipices, I trained myself to ride in Auvergne in places of this kind and by gradual care and trouble was able to make myself equal to the average in the matter of 'bad head.' "

The height terror induced by visual impressions of a special kind recalls one phase of the dreamy mental state, that in which it reaches supreme terror with physical prostration, but a closer analogy to that state is, perhaps, to be found in the thoughts which arise during the inhalation of certain anæsthetics, and notably of nitrous oxide, thoughts which are nebulous and voluminous, but which have never in them any tinge of fear or alarm, but are always inflated and exhilarating. When nitrous oxide is breathed in the pure state, it abolishes volition and consciousness so rapidly that it is not possible for the person breathing it to observe distinct stages in its triumph over him, but when it is inhaled diluted with air its successive effects may be and have been many times marked and recorded. A momentary sense of suffocation accompanying hurried breathing is followed by feelings of fulness in the head, fixedness in the eyes and increased resistance in the feet, suggesting that they are on the point of acting involuntarily in

throwing the body forward; after these come giddiness and inability to maintain equilibrium, thrilling and vibrating sensations throughout the body, impairment of the power of accommodation of the eyes and increased acuteness in the sense of hearing, so that distant and otherwise faintly heard sounds are judged to be near at hand. Still later come the mental symptoms which consist in convictions of emancipation, relief and happiness, in grand and sublime ideas, which in their expansion seem to break down all barriers of doubt and difficulty, and to make a wish and its realisation one—and which as they dissolve into delirium and confusion are accompanied by extreme susceptibility to suggestions from without and automatic movements, such as the rapid repetition of a gesture, or the vehement shouting many times over of some word or phrase, symptoms which finally merge into convulsive spasms and complete insensibility. It is at the point where the habitual control or check of the highest centres is withdrawn and where subordinate centres are free to indulge in unwonted activity that the expansive dreamy thoughts and exalted feelings present themselves in the progress of nitrous oxide intoxication. These thoughts or feelings are almost invariably of an agreeable character, for patients sunk in profound melancholia who have had nitrous oxide administered have allowed on their recovery from its effects that they had forgotten their misery for a little, had felt lively and like themselves again, or had even had a foretaste of heaven. But these thoughts and feelings, although always agreeable, vary

vastly in character, and range from a simple sense of well-being and enjoyment up to the most magnificent conceptions, their complexion and amplitude being apparently determined a good deal by the personal equation. In persons of average mental calibre they are pleasant and stimulating, but in no ways remarkable, but in persons of superior intellectual power they become thrilling and apocalyptic. A working man who inhales the gas intimates on his recovery that he felt very happy, just as if he had had a little too much beer—and a philosopher announces that the secret of the universe had been for one rapt moment made plain to him, but only to be swallowed up again in returning consciousness.

The expansive and stupendous nature of the dreamy thoughts induced by nitrous oxide in persons of superior and trained intellect is well exemplified in the researches of Sir Humphry Davy on this gas—researches which, although they were carried out more than a century ago, have not been surpassed in interest and value by any since made. Describing the effects on himself of long-continued inhalation of the dilute gas, Sir Humphry Davy said: “My emotions were enthusiastic and sublime. I endeavoured to communicate the discoveries made during the experiment, but my ideas were feeble and indistinct; one collection of terms presented itself, and with the most intense belief and prophetic manner I exclaimed, ‘Nothing exists but thought; the universe is composed of impressions, ideas, pleasures and pains.’ When I was awakened from this semi-delirious trance indignation and pride were the first

feelings produced by the sight of the persons around me.” On another occasion Davy remarks: “The sensations were so intense and pure as to absorb existence, and I fell into unconsciousness.”

But Davy experimented, not merely on himself, but also on his friends with nitrous oxide—and as among these friends were Coleridge, Southey, Edgworth and Dr. Roget, we have in their observations the best possible evidence as to the operation of the gas on the mental faculties, on men of high intellectual endowment. Well, that evidence is uniformly to the effect that the gas induced delicious feelings and heroic or stupendous thoughts. Indeed, of all anæsthetics nitrous oxide seems to be definite and uniform in the emotions and dreamy thoughts it induces in cultivated people, and therefore in the lines and order of its invasion of the higher nerve centres in them. The emotions are almost always pleasurable, the thoughts are very frequently connected with some great discovery, some supposed solution of a cosmic secret. A medical man upon whom my former colleague, Dr. Mitchell, experimented with nitrous oxide, imagined before becoming unconscious that he had made a most important discovery explaining the whole action of the gas; and Dr. Mitchell himself had repeatedly the same experience, his mind being seized by expansive ideas which while they lasted made all dark things clear.

So vivid is the impression as to the reality of the ideas met with at the vestibule of nitrous oxide anæsthesia—and as to the genuineness of the insight they give—

that many attempts have been made by sudden interruptions of the inhalation and by strenuous exertions of will power to hold and capture them, it need scarcely be said without success. We might as well look for phosphorescence on the sea in the blaze of midday sunshine as hope to reproduce such dreamy mental states in the full light of objective consciousness. Nothing but a vague remembrance that they had flashed across the mind remains when waking life is resumed, and endeavours to recall them, or grasp them in passing, when not wholly futile, are apt to prove ludicrous in their results. Oliver Wendell Holmes has told the story of the Professor who, having experienced a magnificent thought in the early stage of chloroform inhalation, resolved that he would by one bold sally lay hold of it and so read the riddle of the universe. Having composed himself in his easy-chair with writing materials at hand he inhaled the chloroform, felt the great thought evolve in his mind, roused himself for an instant, seized the pen, wrote desperately he knew not what, for even as he did so he fell back unconscious. On coming to himself he turned eagerly to the paper, to find inscribed on it in sprawling but legible characters the secret of the Universe in these words: "A strong smell of turpentine pervades the whole."

When dreamy mental states are linked with epilepsy or other serious nervous disease, their effects are, of course, merged in those of the graver malady, and when they are an insulated ailment it may be questioned whether they have any effects that are clearly distin-

guishable. They carry with them, except when occurring while those who experience them are in positions of peril, no risk to life. They do not tend to self-perpetuation to anything like the same extent as epileptic fits, for in many instances they are, as it were, excrescences of childhood and youth, and wear themselves out in middle age. Even when they cling for life, it is often impossible to attribute to them any pernicious results; and yet in some cases they do have consequences of a painful and crippling description.

That dreamy mental states may persist throughout life without appreciable detriment to body or mind is, as has been said, undoubtedly true, but the same thing is true of epilepsy, which does occasionally go on into extreme old age without apparent impairment of intellect or general health. It is sometimes even hinted that epilepsy, or the *morbis sacer*, is advantageous to intellectual development. We are told that Julius Cæsar and Mahommed and Marlborough and Napoleon and Wellington were epileptic, and are led to infer that that disease is almost an essential condition of great military genius, and the names of Molière and Sheridan and Balzac and Flaubert and other eminent writers who have been epileptic are mentioned in order to suggest that that disease is sometimes a valuable ingredient in literary talent. But a strict examination of all such cases brings out the truth that, when the epilepsy did not come late in life as a result of cerebral wear and tear, it did not promote, but to some degree marred, the genius or ability on which it was grafted.

No doubt cases are encountered in which lifelong and violent epilepsy has proved not incompatible with great and sustained mental vigour. I have known a magistrate who at eighty years of age was a model of shrewdness and industry, and was still taking an active part in county business, and who had, from puberty, suffered from epileptic fits at short intervals, and there are men similarly afflicted who now fill important public positions with usefulness and distinction. Dostoieffsky, the Russian novelist, was from his youth subject to epilepsy of the worst type, and yet, notwithstanding this malady and intolerable hardships endured during imprisonment, penal servitude in Siberia and enforced military service, he lived to the age of sixty, and went on to the end producing novels which will make his name live for ever, and in one of which he has delineated with minute observance and rare fidelity the symptoms of his own disease.

But such cases are exceptional. The rule is that epilepsy is a blighting, a crippling, a destroying disease. Our asylums, workhouses, prisons and hospitals are full of the *débris* of its storm, and the flotsam and jetsam left by these may now and then be recognised floating hopelessly in the stream of population in our streets. And so, if dreamy mental states may co-exist with brilliant intellectual powers, with robust health and energetic character, they may also tend to undermine the mental and bodily constitution. It is difficult to gauge their effects. Even when occurring in great men it is impossible to say that they have not to some extent limited

the greatness to which they are attached; and in ordinary men they do assuredly in some cases blunt the fine edge of talent and induce dulness or lower the breaking point of the brain. When they occur at wide intervals their effects are probably immaterial; they are so slight and fugacious as to escape notice. But when they come very frequently or in batches, mental depression or torpor may result from them. They tarnish for a time the brightness of the brain, and reduce the power of resistance of those who suffer from them to other morbid agencies.

John Addington Symonds, the historian of the Renaissance, suffered from dreamy mental states which left on him discernible traces. "Suddenly in church or in company," he said, "when I was reading, and always, I think, when my muscles were at rest, I felt the approach of the mood. Irresistibly it took possession of my mind and will, lasted what seemed an eternity, and disappeared in a series of rapid sensations which resembled the awakening from anæsthetic influence. One reason why I disliked this kind of trance was that I could not describe it to myself. I cannot even now find words to render it intelligible. It consisted in a gradual but swiftly progressing obliteration of space, time, sensation, and the multitudinous factors of experience, which seems to qualify what we are pleased to call ourself. In proportion as these conditions of ordinary consciousness were subtracted, the sense of an underlying or essential consciousness acquired intensity. At last nothing remained but a pure, absolute, abstract

self. The universe became without form and void of content. But self persisted formidable in its vivid keenness, feeling the most poignant doubt about reality, ready, as it seemed, to find existence break as breaks a bubble. The apprehension of a coming dissolution, the grim conviction that this state was the last of the conscious self, that I had followed the last thread of being to the verge of the abyss, and had arrived at demonstration of eternal Maya or illusion, stirred, or seemed to stir, me up again. The return to ordinary conditions of sentient existence began by my first recovering the power of touch, and then by a gradual though rapid influx of familiar impressions and diurnal interests. At last I felt myself once more a human being, and although the riddle of what is meant by life remained unsolved, I was thankful for the return from the abyss, the deliverance from so awful an initiation into the mysteries of scepticism.”

These subtly analysed experiences of Symonds were not, as one of his critics imagines, an efflorescence of the meditateness and introspectiveness of his nature, but unmistakably dreamy mental states, and dreamy mental states, too, which left a permanent mark or blemish upon him. His achievements, as he has himself declared, fell far short of his own justifiable anticipations and of those of his friends, and throughout life he was haunted by melancholy and by painful but concealed misgivings as to his own weakness. “I feel so weak,” he complains, “so unable to take hold of any subject”—and this was long before his pulmonary

trouble commenced. "I wish and cannot will," he again exclaims. "I cannot concentrate myself on an end of action." There was, it must be admitted, something lacking in him, a disarray of the faculties, constant lassitude and uncertainty as to the path to pursue. His life has been described as a great spiritual tragedy, and it was so apparently because his highest nerve-centres were in some degree enfeebled or damaged by these dreamy mental states which afflicted him so grievously.

Seeing, then, that dreamy mental states, although occasionally an appanage of genius and often innocuous, sometimes are one of a series of morbid events, and sometimes impair the faculties of those who suffer from them, they are deserving of observation and research. Especially in children and in the young should they be sought for and studied. If we want healthy and vigorous men and women we must begin with the babies; and if we want strong and stable brains we must see that their foundations are well and truly laid in the springtime of life. Flaws then overlooked may cause disastrous subsidence long after, and as dreamy mental states are flaws, I advocate their detection, if possible, while they are still remediable. I do not suggest that mere children should be promiscuously subjected to crooked questionings, should have strange fancies put into their heads, or should be encouraged in introspection; but I do counsel that when children exhibit anomalous nervous symptoms, forgetfulness, lethargy, paroxysms of passion, immorality, habit

spasms, tremors or odd movements or tricks, insomnia or headaches, the possibility of dreamy mental states being present should not be overlooked. A few skilful exploratory queries by the doctor will generally bring them to light where they exist, even when they have long been scrupulously hidden away, and their discovery will be a great relief to the little patient and a guide to treatment.

As regards the treatment of dreamy mental states, it need only be said that it is a purely medical question. In almost all cases in which these states mount to such intensity as to demand treatment there is a reduction in the standard of general health and inferentially abnormal nutrition of the brain; and it would seem, indeed, that they depend on the reduction of cerebral nutrition to a lower level in whole or in part, and to an attendant increased instability in the brain-tissue. In those who suffer from them habitually they become aggravated in character during periods of ill-health and debility, and in town-bred children they are often connected with anæmia and excessive mental fatigue or with enfeebling habits. Rest and liberal nourishment rarely fail to alleviate and sometimes remove them altogether, but the rest must be adequate and the nourishment wisely chosen. A diet too rich in animal food has seemed in one case in which I have seen it tried to make dreamy states worse than they previously were. This is indeed what we might have expected. Shakespeare in *Twelfth Night* makes Sir Andrew Aguecheek say, "I am a great eater of meat, and I believe that

does harm to my wit," and whatever the effect of a too liberal diet of animal food may be upon the healthy understanding, there can be little doubt that it is prejudicial to the mental powers of epileptics. Many years ago, at my suggestion, one of my then assistants, Dr. John Merson, carried out at the West Riding Asylum a series of observations bearing on this point. He placed two groups of epileptic patients on a nitrogenous and farinaceous diet, respectively, for a fixed period, and then for a like period he changed the dietary of the two groups, giving those patients who had had a farinaceous a nitrogenous diet, and those who had had a nitrogenous diet a farinaceous one. The patients on whom he experimented were of a chronic and confirmed class—patients in whom long-continued epilepsy had resulted in mental deterioration; and yet even in them marked results were obtained. In 14 out of 24 cases there was a decided decrease in the number of fits during the farinaceous diet, and in a very considerable number of cases it was observed that soon after the nitrogenous diet was commenced mental dulness and stupidity supervened, the patient passing into a state of hebetude which only disappeared when a farinaceous diet was again resorted to. Dr. Sydney Short, of Birmingham, has made observations on the same subject and has found that in a number of epileptic patients, also of a chronic class and inmates of the City infirmary, a reduction of the amount of meat in their diet was followed by a diminution in the number of fits.

The facts that dreamy mental states often cease when

maturity is attained, and that they are frequently to some extent under voluntary control so that they can be reduced or arrested, affords ground for hope that well-ordered education and mental discipline may prevent or dissipate them.

Education carried on on physiological lines must conduce to peace and stability in the higher nerve-centres, and further developments in psycho-therapeutics will put us in possession of methods of regulating mental metabolism more powerful and exact than any yet devised.

HAMLET AND LAMMERMOOR

SIR WALTER SCOTT may be said to have been dominated and permeated by Shakespeare. He had conned him devoutly, absorbed him deeply, and there is not one of his novels that does not bear some impress of Shakespeare's mastership. There are in all the novels, extending from *Waverley* in 1814 to *Castle Dangerous* in 1831, 996 chapters, and it was the custom of Scott to place at the head of each chapter a quotation or motto in some degree appropriate to its subject matter. There are only 24 chapters in all the novels to which there are not headings, and, curiously enough, all these come after *The Betrothed* in 1825. Well, 972 chapters have headings, and of these 212 are quotations from Shakespeare's plays. These Shakespearean quotations are very unevenly distributed through the novels: in *Guy Mannering* there are 19 of them, in *The Surgeon's Daughter* only one; but in the aggregate they show an extraordinary familiarity with Shakespeare's plays which enabled Scott to find at once passages suitable to the ever-shifting scenes he was depicting.

But if the headings of the chapters are thus predominantly Shakespearean, throughout the chapters themselves there are Shakespearean echoes, characters and scenes that have been dipped in Shakespearean dye. It is impossible for me now to adduce even a selection

of these, but I should like to direct attention to one instance in which Scott appears to have been influenced by Shakespeare in a singular degree. I allude to the analogies and similarities which exist between *Hamlet* and *The Bride of Lammermoor*, constituting, to my mind, a conspicuous instance of literary parallelism which escaped the notice of Isaac Disraeli in his *Curiosities of Literature*.

I do not in the remotest way suggest appropriation or conscious imitation. That would be as absurd as to accuse Shakespeare of plagiarism because of the use he made of Plutarch and Holinshed; Swift truly said: "If I light my candle from another that does not affect my property in the wick and the tallow." Scott had an unlimited supply of wick and tallow of his own, *but he sometimes lighted his dips* (and dips he called his novels, for he once triumphantly exclaimed to Ballantyne, when contemplating a cheap and popular issue of them, "We must have dips for our wax candles"), when he had not a spunk of his own handy, at the taper or torch of someone who had gone before him. It seems to me that in the case of *The Bride of Lammermoor* he derived illumination more than once from Shakespeare's inverted torch of *Hamlet*, lurid and brilliantly flaming, and that he did so under circumstances of rare psychological interest.

Hamlet is, at any rate in the popular judgment, the greatest of Shakespeare's plays, and *The Bride of Lammermoor* is by general consent the greatest of Scott's novels. "It is to my fancy," said Lockhart, "the most pure and powerful of all the tragedies that Scott ever penned."

Mr. Gladstone told Lord Ashbourne that *The Bride of Lammermoor* was his favourite amongst the novels of his favourite novelist, and Lord Lytton said, "There are three masterpieces in narrative which can never be too much studied—the *Ædipus Tyrannus*, the *Bride of Lammermoor* and *Tom Jones*."

Many other eminent authorities might be cited to bear testimony to the primacy that *The Bride of Lammermoor* holds in the Waverley group, a primacy analogous to that of *Hamlet* amongst Shakespeare's plays. Of all Shakespeare's plays *Hamlet* has most of the amplification of the novel, and of all Scott's novels *The Bride of Lammermoor* is most dramatic in its treatment, and both of these great works have exactly the same tragic touch. In both there is the same fierce conflict of vengeance and remorse, love, hatred, with supernatural terror brooding over all. In both the action sweeps on, and one feels it from the first like a torrent, hurrying in its dark and resistless course, all the personages concerned, the good and the wicked, towards a catastrophe not brought about by human will, but dug by destiny.

It is not merely, however, in intensity of tragic gloom—that of all noble tragedy since the trilogy of Æschylus—that I would suggest relationship betwixt *Hamlet* and *Lammermoor*,—but in a number of particulars, a few of which I will enumerate, leaving it to your remembrances of the play and the novel, when these are brought together, to fill in my rough outline.

The scenes of the play and the novel are strikingly alike—*Hamlet* is mainly enacted on the battlements and

in the halls of the Castle of Elsinore, a rugged Danish stronghold commanding the entrance to the Baltic, perched high above turbulent waters and perhaps visited by Shakespeare. *The Bride of Lammermoor* is mainly enacted on the battlements or in the halls of Wolf's Crag, a grey, half-ruined fortalice, placed on a projecting cliff that beetled on the German Ocean—in reality Fast Castle, which was well known to Sir Walter Scott.

But more significant than the scenery is the human element in *Hamlet* and *Lammermoor*, and that is often in close agreement in the two. Hamlet and the Master of Ravenswood are twin brothers—intellectually they are akin—Hamlet soars into the loftiest region of human thought, and Ravenswood is the most highly gifted and reflective of all Scott's heroes. Both are under a vow to revenge a murdered father, and in both the vow has a supernatural sanction. Hamlet was under commandment of his father's ghost. Ravenswood, after witnessing his father's dying agonies and hearing the curses he breathed against his adversary, secretly at midnight cut a lock from his hair, and as it consumed in the fire, swore that his rage and revenge should pursue his enemies until they shrivelled up like that scorched symbol of annihilation. For both the times were out of joint, and both pushed on by events found that the impossible was required of him. Both were in love, each with a woman, lovely, soft and yielding, wanting in power of resistance; and both found in his love his ruin and frustration. The one was the counterpart of the

other in form, feature and attire; Hamlet is described as of princely form and manly bearing, was clad in "inky cloak" and "customary suits of solemn black," and the Master of Ravenswood, of majestic mien and regular features, wore a loose mourning cloak thrown round him, and a Montero cap with a black feather that drooped over his brow.

Ophelia and Lucy Ashton are twin sisters. Both are young, fair, inexperienced girls, and it is their innocence, sweetness and weakness, in the straits in which they are placed, that move our profound pity. Both fondly open their hearts to a young love that rends them. Both sacrifice their love to paternal authority, and both, by this and by their lovers' reproaches, are maddened with a madness that runs into babbling, despair and death. One cannot hear Ophelia's "To-morrow will be Saint Valentine's Day," without thinking of Lucy Ashton's "Tak' up your bonny bridegroom." Both were buried with maimed rites.

"Must there no more be done?" asks Laertes at the funeral of Ophelia.

"No more," the priest replies.

"We should profane the service of the dead
To sing a requiem and such rest to her
As to peace parted souls."

"The melancholy ceremony," said Sir Walter Scott of the funeral of Lucy Ashton, "was performed in the misty dawn of an autumn morning, with such moderate attendance and ceremony as could not be dispensed with. Here in a coffin, bearing neither name nor date,

were consigned to dust the remains of what was once lovely, beautiful and innocent, though exasperated to frenzy by a long tract of unremitting persecution.”

With Laertes, Ophelia's brother in *Hamlet*, Colonel Ashton, Lucy Ashton's brother in *The Bride of Lammermoor* had much in common. Both took it upon them to avenge what they considered their sister's wrong, and both had an encounter with him who had wronged her as they believed, over that sister's grave. Hamlet fell in a duel with Laertes, the Master of Ravenswood was engulfed in the quicksand while hurrying sword in hand to a duel with Colonel Ashton.

I could carry the comparison between characters in *Hamlet* and *The Bride of Lammermoor* further, but do not wish to labour the case. I should like to point out, however, some structural resemblances. In both there is supernatural machinery: in *Hamlet*, the ghost of his father, majestic, armour clad, beckoning away and delivering its dread secret and charge; in *The Bride of Lammermoor*, the ghost of Blind Alice at the Mermaid's Well, shrouded and wan, appearing to Ravenswood at the hour of her death, and the crisis of his fate, with warning hand and mutterings of withered lips. In both there is a picture scene, “Look here upon this picture and on this,” and in both a churchyard scene, with an interview between the hero and a sententious gravedigger.

Not incomparable with Shakespeare's supreme touch in Hamlet's last words, “The rest is silence,” is Scott's closing incident of the finding by Caleb Balderston on

the Kelpie's flow of the large sable feather, the sole vestige that remained of the vanished Master of Ravenswood.

“ He shall stable his steed in the Kelpie's flow
And his name shall be lost for evermo'e.”

There are, no doubt, other reflections of Shakespeare in *The Bride of Lammermoor*. The sudden and passionate attachment of Ravenswood and Lucy Ashton, intervening in the hereditary feud of their families, recalls Romeo and Juliet, and the three village hags are reminiscent of the witches in *Macbeth*; but it was assuredly *Hamlet* that haunted the corridors of Sir Walter Scott's brain while he was inditing this “ Tale of a Landlord,” and high psychological interest attaches to the question how the Hamletular infusion took place in the circumstances under which *The Bride of Lammermoor* was written. It was composed in April 1819, while Scott was passing through an acute attack of an intensely painful and prostrating malady from which he suffered at intervals for years. The malady was called cramp of the stomach, or spasms, but, looking back on it now in the light of modern experience, there is no difficulty in recognising it as gallstones, a malady which did not finally carry him off, but which caused him the utmost distress, and must have absolutely disabled any man of less buoyant temperament and less resolute will, a malady, let me add, of which he could now have been promptly relieved. He was emaciated and broken down, with scarcely muscular strength enough to hold himself

upright, lying upon a sofa, sick, and often turning himself upon his pillow with a groan of torment, as he dictated to Laidlaw and Ballantyne *The Bride of Lammermoor*. His sentences were sometimes interrupted by cruel pangs, “but,” says Laidlaw, “when duologue of peculiar animation was in progress, spirit seemed to triumph over matter, he arose from his couch and walked up and down the room, raising and lowering his voice, and, as it were, acting the part.”

And very remarkable was one of the consequences of the mental effort under such adverse conditions. The book, says James Ballantyne, “was not only written but published before Scott was able to rise from his bed; and he assured me that when it was first put into his hands in a complete shape he did not recollect one single incident, character or conversation it contained. He did not desire to convey that his illness had erased from his memory the original incidents of the story with which he had been acquainted from boyhood. These remained rooted where they had ever been, or, to speak more explicitly, he remembered the facts of the existence of the father and mother, of the son and daughter, of the lovers, of the compulsory marriage, and the attack made by the bride upon the hapless bridegroom with the general catastrophe of the whole. All these things he recollected, just as he did before he took to his bed, but he literally recollected nothing else—not a single character woven by the romance, not one of the many scenes and points of humour, nor anything with which he was connected as the writer of the work. ‘For a long

time,' he said, ' I felt myself very uneasy in the course of my reading, lest I should be startled by meeting something altogether glaring and grotesque.' ”

That Scott's mind was in a state of abnormal exaltation when he produced *The Bride of Lammermoor* is clear. He wrote himself at this time: “ I certainly began to have some doubts whether the mischief was not getting at my mind.”

“ I had another of my attacks,” he wrote again, “ and felt as if a phantasmagoria was going on around me.” He had been having large doses of opium, and it may well have been that in the phantasmagoria in which he was involved the mind not only failed to register its processes but was inundated by figures and images rising spontaneously from the mysterious depths of memory, affinitive impressions and reminiscences in the guise of new conceptions. It may well have been that as Scott, in sore travail, stitched the glorious tapestry of *The Bride of Lammermoor*, some old Shakespearean threads that came to hand got mixed up with it.

THE LIGHTENING BEFORE DEATH

ONE of the characteristics of the age is the palliation of death, a reversion from grisly mediævalism to the epicurean heedlessness of the Romans. We still, as Bacon said, fear it as children do the dark, but we ignore it as much as possible. Our ancestors kept death well in evidence and exaggerated its terrors, but in these busy times there is no room for it, so we give it merely a passing glance or smother it in flowers. It is referred to euphemistically or periphrastically. Children are reared without any knowledge of it. *Memento mori* is no longer a popular exhortation. Mourning has been minimised and abbreviated. Cemeteries are pleasant gardens with none of the grimness of the "auld kirk-yard." The skull and crossbones are abhorrent as tombstone ornaments. Cremation is sanitary and conclusive. Executions take place in private. Young's *Night Thoughts* and Blair's *Grave* are dusty on the top bookshelf in the library, and Holbein's *Dance of Death* is unredeemed from aversion by the richness of his colours or the delicacy of his touch. Anyone who invoked death as Queen Constance does in *King John*, as "an odorous stench," "sound rottenness," "a carrion monster" and offered to buss this hideous impersonation would be considered in exceedingly bad taste. Even intense feeling would not be held to justify such coarse language.

Among the less affluent classes death is not so much deprecated, although even for them he has somewhat "smoothed his wrinkled front." It is nearer to them in their crowded precincts and it is emphasised in the funeral, which is a supreme and costly event, very impressive because a momentary triumph in the struggle against meanness and insignificance. A woman of the people when recounting the loss of her husband will almost invariably say, not "My husband died on such a day," but "I buried my husband on such a day." The hearse, the mourning coach or omnibus, the sleek undertaker and his men, the crape and the baked meats have been memorised more deeply than all the phenomena of dissolution.

It is well that death has been relegated to its proper place and should no longer be allowed to dominate life. *Timor mortis conturbat me* is a somewhat craven refrain, and men who have to be up and doing cannot for ever be brooding on their latter end. That must be paralyzing. But still death has to be reckoned with. It has been a benefactor of mankind—a great stimulant, a prophylactic—an educator and reformer. What would the world have been without it? Wholesome lessons are still to be learnt from the contemplation of it. Insight may come from the observation of that unrobing of the spirit and laying aside of the embellishments of life. It is the inlet to eternity. It is the necessary complement of heredity, for the being with his hold on the past has claims on futurity. It is but the snapping of the last strand of the retaining gear and then the props

fall away and the craft glides into another element. The process of disentanglement of the subtle principle that "wanton in endless being" from the worn-out machine that "rots, perishes and passes" may, under reverent scrutiny, yield some hints as to their mysterious union. Let us take immortality for granted. The craving for it is an instinct. It is an insurmountable human obsession, an inexpugnable implicit conception of the mind. A dying Rabbi who had all his life been extremely religious but had suffered from want and misery said, "Do you know, if, after all the sad experiences I have had in the past, there is no future life, I shall be greatly amused." "I cannot call myself orthodox," said Tennyson, "but there are two things I have always been firmly convinced of, God, and that death will not end my existence." "Generally now it seems to me," wrote Carlyle in his note-book, "as if this life were but the inconsiderable portico of man's existence which afterwards in new mysterious environment were to be continued without end. I say 'seems to me,' for the proof of it were hard to state by logic; it is the fruit of faith." The average man when he comes to think of it cannot tolerate the notion of permanent eclipse. To enter on an eternity of blank oblivion. Impossible! We who are so impatient for our daily paper to learn the gossip of the passing hour, to be cut off for ever from all knowledge of the universe. No! No! We hold pledges against it in our affections. Oblivion was conquered once for all when we were projected into this breathing world. We can never be

deprived of our birthright of being. Death has endless possibilities.

“ There is no death, what seems so is transition,
This life of mortal breath
Is but a suburb of the life elysian,
Whose portal we call death.”

“ The question,” says Sir James Frazer, “ whether our conscious personality survives after death has been answered by almost all races of men in the affirmative. On this point sceptical or agnostic peoples are nearly if not wholly unknown. Accordingly, if abstract truth could be determined, like the gravest issue of national policy, by a show of hands or a counting of heads, the doctrine of human immortality or at least of survival after death would deserve to rank amongst the most firmly established of truths, for were the question put to the whole of mankind, there can be no doubt that the ‘ ayes ’ would have it by an overwhelming majority.” Accepting then this *Vox populi* as the *Vox Dei*, we must regard with profound interest the critical point where life merges in immortality. Hitherto soul and body have been bound up together and the manifestations of the one have depended on the conditions of the other, as Bacon has it, like the musician and his instrument. No thought, no emotion, no volition has arisen, save in association with movements in the cells and molecules of the brain, no agitation in these has been unaccompanied by sensations, feelings, ideas, or impulses. Now, however, the mysterious association is ended. Inexplicable in its origin, it is inscrutable in its termin-

ation. It is incomprehensible. We are not made to grasp either beginnings or endings, and the further we advance in our investigation of them the more perplexing does the problem become. The molecules remain, but their movements only tend to decay. Consciousness is withdrawn and the physical substratum is inert and impotent, although physical and chemical changes are still going on in it. The brain of a dead Shakespeare is worth no more than that of a dead Hottentot. A momentous change has taken place. Now moments of change are the opportunities of science. Analysis is only possible in decomposition, hence the importance of studying death.

It is not my purpose here to enter on so wide a topic as a study of death, but only to direct attention to a peculiar phenomenon by which death is occasionally preceded. "How oft have men when at the point of death been merry, which their keepers call 'The lightening before death.'" These are Shakespeare's words, and they express what was a popular belief in his time, perhaps confirmed in his own experience.

The moods in which men approach death or in which it finds them are of course infinitely various, and for the most part traits of personal character are revealed in them. Shakespeare has represented Mercutio as continuing to jest though conscious that he was mortally wounded, the expiring Hotspur as thinking of nothing but honour, and the dying Falstaff as still cracking his jokes about Bardolph's nose. Montaigne contemplated classifying these moods and making a collection of minute

accounts of the deaths of remarkable persons, observing “ their words, their actions and what sort of countenance they put upon it.” Had he done so he would have left us a curious conspectus, and must have noticed many instances in remarkable persons of sudden and surprising revival, at the point of death, of some pre-existing train of thought. Such an instance was afforded by Queen Elizabeth. When sinking and speechless, being again besought by her Ministers who were assembled in her chamber to nominate her successor, “ suddenly heaving herself upwards in her bed, and putting her arms out of her bed, she held her hands jointly over her head in the manner of a crown,” which was taken to mean that, as she had previously intimated, her cousin the King of Scotland should occupy her throne.

Reversions to remote memories and habit of thought are not uncommon when death is impending. Dr. Rush of Philadelphia mentions that a Lutheran clergyman informed him that Germans and Swedes, of whom he had a number in his congregation, when near death prayed in their native languages, though some of them, he was confident, had not spoken those languages for fifty years. In Goethe's *Conversations*, a case is related where an old man of the lower class on his deathbed was heard to recite several passages of the most elegant Greek, and it was afterwards discovered that in his boyhood he was compelled to commit to memory Greek passages, and not until he was at the point of death fifty years afterwards had these to him meaningless words been repeated.

But it is not to such transient gleams of reminiscence in the gloom of death under external sollicitation that the term "Lightening before death" is generally applied. It signifies a rarer and subtler experience in which at the very threshold of the dark portal there comes a flash that makes all things clear, and even penetrates, as it were, a little way beyond the portal. Is this so? Is it the case that when from any cause, insanity, dotage or the delirium or stupor that supervenes on bodily disease, the mind has become obscured, a clearing up may take place when death is imminent? Is it possible that on the very brink of death the cloud of madness or of coma may lift for a little, and give a glimpse of an auroral dawn? It is obviously a matter of great consequence to determine whether, amidst its flickering, a moment of steady radiance is possible in the lamp of life before its extinction. For all of us the question has a personal interest. Will my death have a lightening before it? When we watch the hovering powers of life in some cherished tabernacle of clay, shall we perchance see them concentrate in one brief farewell illumination in which yearning, love or contrition or forgiveness may stand forth confessed? The question has also a legal bearing. Is it susceptible of proof that when lunacy or senility or coma has caused incapacity, a sound mind, memory and understanding may be restored for a little at death's door, so that a valid testamentary disposition might then be made, or testimony borne that might be used as evidence?

As a general rule, a twilight deepening into darkness

ushers in death. A state somewhat resembling dreaming occurs, and then, through progressive stages of vagueness and confusion, oblivion is reached. The functions of the brain become more and more clogged and restricted, until they are arrested altogether. Through lethargy Nirvana is attained. But there are exceptions to this rule. There are cases on which recovery of brain power is the prelude to its final extinction. What may be called a lightening before death may take place even where there has been no previous obscuration, for how else can we designate the noble serenity, and clarity of mind, and radiant anticipation, with which the faithful encounter death, as set forth in Pope's ode :

“ Vital spark of heavenly flame !
 Quit, oh quit this mortal frame :
 Trembling, hoping, lingering, flying,
 Oh the pain, the bliss of dying !
 Cease, fond Nature, cease thy strife,
 And let me languish into life.

Hark ! they whisper ; Angels say,
 Sister Spirit, come away,
 What is this absorbs me quite ?
 Steals my senses, shuts my sight,
 Drowns my spirit, draws my breath ?
 Tell me, my Soul, can this be death ?

The world recedes ; it disappears !
 Heaven opens on my eyes ! my ears
 With sounds seraphic ring :
 Lend, lend your wings ! I mount ! I fly !
 Oh Grave ! where is thy victory ?
 Oh Death ! where is thy sting ? ”

Cardinal Newman expressed the feeling that death is the revelation of the nothingness of the soul before

God, in his wonderful picture “ of the fallings from us and vanishings ” of the material world in the moment of severance of the soul from the body :

“ Jesu, Maria, I am near to death,
 And thou art calling me ; I know it now,
 Not by the token of this faltering breath,
 The chill at heart, the dampness on my brow,
 (Jesu, have mercy, Mary, pray for me !)
 ’Tis this new feeling never felt before,
 (Be with me, Lord, in my extremity !)
 That I am going, that I am no more.
 ’Tis this strange innermost abandonment,
 (Lover of Souls, great God I look to thee !)
 This emptying forth of each constituent
 And natural force by which I came to be.”

Whenever what we call unconsciousness other than sleep is consciously approached by a calm and cultivated mind capable of looking before and after, there is a sense of wonder and elevation. Speaking from personal experience, Mr. John Murray says that “ in the case of an operation of which no one could foretell the result fear was undoubtedly present during the days of preparation, but when the patient is actually on the operating table this seems to pass away and to give place to a sensation of the inevitable, not unmixed with curiosity.” Those who have inhaled an anæsthetic with a determination to grasp and record its psychical effects have uniformly borne witness that there is a moment of what seems to be brilliant insight and enlargement of view before the plunge into insensibility. The impression cannot be translated into words. It is an indescribable revelation or beatitude. Sir Humphry Davy, after

breathing nitrous oxide or laughing gas, said, "My emotions were enthusiastic and sublime." The attempt to give utterance to the thoughts that arise at this juncture generally results in incoherent babble, but the conviction often remains that a great discovery was made but eluded capture. In hypnosis the same thing occurs. In its first stage, when consciousness of what is going on around is retained, although there is complete loss of voluntary power there is frequently a sense of translation into a new sphere of being. "In my own experiment of being hypnotised," writes Dr. Hadfield, "I have found the first stage to be one of extraordinary lucidity. One's mind seems to pass into space in which the atmosphere is rarefied and thought is clear and electric. One seems to have a bird's-eye view of events, to see them in their entirety and to be conscious of their minutest details."

In the first stage of death, if it may so be called when the shadows are gathering round, the same kind of momentary illumination is sometimes experienced, and it is this kind of lightening before death that has been accepted as a glimpse of the other side, a sort of Pisgah vision of the promised land. A dignified presentiment takes possession of the mind. What was enigmatical is made plain. What was bound down is unconstrained, but the lips cannot convey the transport. "When in your last hour," said Jean Paul Richter, "all faculty in the broken spirit shall fade away and die into inanity—imagination, thought, effort, enjoyment—then at last will the night flower of belief alone continue blooming

and refresh with its perfume in the last darkness." Herder, a short time before his death, said, "Everything now appears to me so clear that I regret not being able to communicate it," and Madame Roland on the scaffold called for pen and ink that she might try to note the very peculiar thoughts that came to her in her last moments. Vespasian said with his last breath, "Ut puto Demfio." The late Bishop of Durham told us that in Cowper the poet that mysterious mental gloom which was latterly always upon him gave way, half an hour before his death, to an indescribable joy of unspoken rapture. Marshall Hall, that great physician, consciously came near death, out of much suffering, and placidly resigned himself to its embrace, but as he was passing away he twice raised both hands, joined them and let them fall softly on the bed while he smiled benignly as if some vision had been vouchsafed to him. William Allingham, that graceful poet, while lying peaceful in a kind of trance on the day of his death, aroused himself and said, "I am seeing what you know nothing of."

Free use has been made of this kind of lightening before death in fiction. Miss Elizabeth Stuart Phelps adroitly employed it in *The Gates Ajar*. She pictured a very commonplace and uninviting heaven like that of the Spiritualists, just our earth, a little rarefied, and then clinched the matter by making the widow turn on her death-bed from the fading prospects of the world, with glowing recognition to her dead husband, to whom she addresses conventional greetings.

Finer and more artistic is Victor Hugo's rendering

of the lightening before death. The blind girl Dea, the heroine of *L'Homme qui Rit*, one of the chastest and most lovely creations of modern literature, after the bitterness of separation is reunited to her lover Gwynplaine, whose hideousness she knows not, and perishes under a blow of happiness :

“ Her words were more and more inarticulate, evaporating into each other as if they were being blown away. She had become almost inaudible.

“ ‘ Gwynplaine, ’ ” she resumed, ‘ you will think of me, won't you ? I shall crave it when I am dead. ’ Then she added, ‘ Oh, keep me with you, ’ and after a pause, ‘ Come to me as soon as you can. I shall be very unhappy without you even in heaven. Do not leave me long alone, my sweet Gwynplaine. My paradise was here, above there is only heaven. Oh ! I cannot breathe, my beloved. My beloved ! My beloved ! ’

“ ‘ Mercy ! ’ cried Gwynplaine.

“ ‘ Farewell, ’ murmured Dea.

“ And he pressed his mouth to her beautiful icy hands. For a moment it seemed as if she had ceased to breathe. Then she raised herself on her elbows and an intense splendour flashed across her face, and through an ineffable smile her voice rang out clearly. ‘ Light, ’ she cried. ‘ I see, ’ and she expired. She fell back rigid and immovable on the mattress. ”

Familiar fond records of scenes like this are silently harboured by many of us, even the most sceptical. We are all mystics in the actual presence of death, if only temporarily so. A smile, a look, a word has come back

from the solitary voyager when all seemed over, a signal of love and hope that has done more to strengthen the trembling knees of faith than all the wisdom of the theologians. Verily, the gates of agnosticism shall not prevail against it.

But there are other kinds of lightening before death besides "visions splendid" and "bright streaks of futurity." Carnal cares sometimes intrude themselves amidst the tolling of the passing bell. Reminiscences as well as anticipations stir strangely in the mind and quicken it into vivid activity. In the moment of poignant apprehension of death there passes before the mind's eye in some cases a panorama of the whole of a lifetime. In the few seconds occupied by a fall from a height or in the few minutes of death by drowning, millions of brain cells, as it were, give up their dead and multitudes of recollections crowd through consciousness. Those who have lived to tell of such an episode have in some cases affirmed that it was as if the recording angel had read the complete biography, every trivial forgotten incident being remembered and appraised.

Admiral Beaufort in a letter to the Rev. Dr. Wollaston gives an account of his feelings when on the verge of death by drowning: "After all struggling had ceased, a calm feeling of the utmost tranquillity succeeded the previous tumultuous sensations. The whole of my existence seemed to be placed before me in a sort of review and each act of it seemed to be accompanied by a consciousness of right and wrong. Many trifling events which had long been forgotten crowded my

imagination." De Quincey mentions that a near relative of his having in her childhood fallen into a river told him that she saw in a moment her whole life's incidents arranged before her as in a mirror, not successively but simultaneously.

But where death comes quietly ushered in by no spasm of fear, strange partial reminiscences may present themselves. The dying man suddenly recalls some incident. Sir Walter Scott relates that a former Duke of Roxburgh who had a large and curious library was accustomed to employ a liveried servant named Archie in arranging his books and in fetching and replacing the volumes which he wanted. "To secure the attendance of Archie, there was a bell hung in his room, which was used on no occasion except to call him individually to the Duke's presence. His Grace died in London in 1804; the body was to be conveyed to Scotland to lie in state at Fleurs and to be removed from thence to the family burial place at Bowden. At this time Archie, who had been attacked with a liver complaint, was in the very last stage of the disease, yet he prepared himself to accompany the body of his master whom he had so long and so faithfully waited upon. The medical persons assured him that he could not survive the journey, but as he persisted in his resolution he was permitted to attend the Duke's body to Scotland. When they reached Fleurs he was totally exhausted and obliged to keep his bed, in a sort of stupor which announced speedy dissolution. On the morning of the day fixed for removing the body of the dead Duke to

the place of burial, the private bell by which he was wont to summon his attendant to his study was rung violently. This might easily happen in the confusion of such a scene, although the people of the neighbourhood prefer believing that the bell sounded of its own accord. Ring, however, it did, and Archie, roused by the well-known summons, rose up in his bed and faltered in broken accents, ‘ Yes, my Lord Duke! Yes, I will wait on your Grace instantly,’ and with these words on his lips he is said to have fallen back and expired.”

A hard old Scotchwoman in whom straitened circumstances had more deeply engraved her native thrift, which grew into miserliness as the helplessness of old age stole over her, came to lay down her shrivelled and penurious life and dropped into a sleep which was thought to be her last. She sank into a drowsiness from which she could not be roused. Her niece, a young, buxom woman, her only companion, watched by her bedside. As darkness came on and the heavy breathing still continued, she lighted a candle and placed it near the bed to cheer her dreary vigil. The feeble light fell on the face of the old woman and a change was noticeable in her condition. The laboured breathing was interrupted, the hands and features moved; she raised herself, gazed vacantly round her, and then seeming to realise the situation, said, “ Put out the licht, Janet! Put out the licht; I can see weel enough to dee in the dark.” After which she lay back and died. One pities Janet thus admonished, but cannot but admire the old lady’s intrepidity. Unenervated by luxury she

valued death even less than a farthing candle. She had a genuine lightening before death. The rays of the candle reaching the retina through half-closed eyelids and hazy media evoked one last weird denunciation of wastefulness and that weakness of which wastefulness is born. As she had lived so did she die in a throe of economy.

The most masterly picture ever painted of the resurrection of memory in the chamber of death is contained in *The Antiquary*. Elspeth of the Craighburnfool, an aged crone, imbecile through years and infirmity, deaf and bent, is represented as being raised out of her dotage and apathy by the intelligence which works its way slowly into her torpid mind that her former mistress and partner in an atrocious crime is no more. This fact once appreciated, caused her desert memory to blossom like deadly nightshade. Stupefaction departed; vacancy was peopled. Her old transgressions rose up in judgment against her and much of her youthful vigour was restored. As, shaking off the icy bands of second childishness, the ancient Sibyl recalled the traditions of the family, doughty and dour, which she had served so long, a listener exclaimed, "Eh, sirs, it's awesome to hear your gudemither break out in that gait—it's like the dead speaking to the living." Remorse leads Elspeth to unload her mind and make what remnant of restitution is possible. She obtains an interview with Lord Glenallan, whom she had conspired against and wronged, and then the crisis seemed to re-endow her with all those powers of mental superiority with which she had

once been gifted. "I may add," says her historian, "as a remarkable fact that such was the intense operation of mental energy upon her physical powers and nervous system that notwithstanding her infirmity of deafness every word that Lord Glenallan spoke, during this remarkable conference, fell as full and distinct upon Elspeth's ear as it could have done at any period of her life. She spoke also herself clearly, distinctly, slowly, as if anxious that the intelligence she communicated should be fully understood, concisely at the same time, and with none of the verbiage or circumlocutory additions natural to those of her sex and condition." A day elapses and the subject is renewed, and then Elspeth with hurried words, recalling her girlish days, carries her story to the grave. In narrating the story, Sir Walter displays his intimate knowledge of human nature and his acquaintance with these "weary dreams that folks have between sleeping and waking, before they win to the lang sleep and the sound."

The lightening before death sometimes consists, not in any agitations, remembrances or premonitions, but in a resumption of the ordinary currents of thought where these have been interrupted by disease. Out of great tribulation the man emerges on a haven of peace in which he pauses a little before crossing the bar. A typical example of this state is afforded by Schiller. "As his strength waned, he became insensible and by degrees delirious. The poet and the sage was soon to lie low, but his friends were spared the further pain of seeing him depart in madness. The fiery canopy of physical

suffering which had bewildered his thinking faculties was drawn aside and the spirit of Schiller looked forth in its wonted serenity once more before it passed away for ever. After noon his delirium abated; about four o'clock he fell into a soft sleep, from which he ere long awoke in full possession of his senses. Restored to consciousness, Schiller did not faint or fail in his last and sharpest trial. Of his family and friends he took a touching but tranquil farewell; he ordered that his funeral should be private, without pomp or parade. Someone inquiring how he felt, he said, 'calmer and calmer.' Simple but memorable words expressive of the mild heroism of the man. After six he sank into a deep sleep: once for a moment he looked up with a lively air and said many things were growing plain and clear to him. Again he closed his eyes and his sleep deepened and deepened till it changed into the sleep from which there is no waking and all that remained of Schiller was a lifeless form soon to be mingled with the clods of the valley."

Schiller died of consumption, and it is noteworthy that it is in this disease above all others that the lightning before death is most likely to occur. The wandering or delirium which oftentimes marks its later stage may be separated from death by an interval of composure and rationality. Novalis, who died of this malady, and was frenzied by it, was himself again before he died. Spinoza too, who exhibited a morbid taint throughout his life—for how else shall we explain his immoderate laughter at the spiders which he had set to fight and at the

struggles of the flies he had entangled in their webs? —Spinosa became violently delirious during the course of the tuberculosis from which he died, and tranquil and reasonable in his last moments. In our mental hospitals are now and then seen cases in which, not only delirium, but also confirmed insanity mysteriously vanishes when phthisis has ensured the victory to the power that “thicks men’s blood with cold.” A girl who had betrayed no sign of animation for years, but sat fixedly in one position, like a breathing statue, began to waste away. No cough or other outward sign betrayed the presence of phthisis, but the emaciation went on, and the stethoscope, that little trumpet of doom, told that she was in a galloping consumption. As her spent frame became almost diaphanous, her long-obscured mind seemed to shine through it. Her hands, which had been crossed on her breast as if petrified in that position, dropped to her sides; her head, which had been bent down, was raised, and her eyes, which had been fixed and lustreless, brightened and looked round with interest. The oppressive languor left her; she moved and spoke, and soon became herself again as she was before her illness. Nothing of the long trance was remembered. She asked for her relations, and when she saw them the fountains of healthy grief were unloosed and she wept when told of the death of a brother. In perfect lucidity she continued until the end came.

“Death,” said Lord Lytton, “is but a ceasing to die.” In the putting on of immortality there is an ascent to a

higher level and perpetuity of consciousness. In the lightening before death the mind is still using the brain as its instrument of expression and turns back, as it were, at the moment of its liberation, drawn by love to reflect one first faint impression of its new and autonomous phase.

“ And I heard a great voice out of heaven saying, Behold, the tabernacle of God is with men, and he will dwell with them, and they shall be his people, and God himself shall be with them, and be their God. And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain: for the former things are passed away.”

PATRICK BRANWELL BRONTË: AN EXTENUATION

JUST over a hundred years ago, on June 26th, 1817, there was born at the Parsonage, Thornton, near Bradford, Patrick Branwell Brontë, not the least remarkable member of a remarkable family. The son of the Rev. Patrick Brontë, the minister of Thornton, Branwell, as he is now called, for he dropped the use of his Hibernian saint-name, was the brother of Charlotte, Emily and Anne Brontë, and with them makes up the deeply interesting Brontë family quadrilateral, but he took no part in the composition of the ever-memorable Brontë novel quadrilateral made up of *Jane Eyre*, *Shirley*, *Villette* and *Wuthering Heights*.

Even in the stress of war-time the centenary of Charlotte Brontë, which fell on April 21st, 1916, was duly celebrated by the Brontë Society and her admirers in literary circles, but that of Branwell, which came a year later, passed unnoticed, and it is fortunate that it did so, for had it been recalled we should have had vials of reprobation poured out on his memory. He is the black sheep of the Brontë flock and has been the target of a cockshy of opprobrious epithets, until it has become the popular conviction that he was merely a dull-witted profligate and confirmed drunkard who wasted his life,

wrecked his home and darkened and perhaps shortened his sisters' lives. Almost all the Brontë writers have a passing stab at him: "unhappy," "ill-starred," "dissolute," "foolish," "depraved," "reckless," "sordid," "degraded," "vulgar," "debased," "diabolical," are a few of the adjectives applied to him. Mr. Clement Shorter has resented the constant intrusion of his name into the biography of his sisters, and Mr. Swinburne pilloried him as a "lamentable and contemptible caitiff, contemptible not so much for his commonplace debauchery as for his lying pretensions and his nerveless cowardice."

Now in all this there is grave injustice and shallow misconception. Branwell had his faults—grievous faults—but he had also many fine qualities. He had his lapses, terrible lapses, but he had also his flights into the empyrean. The evil that he did has lived after him with a vengeance and has been kept lighted up by the effulgence of his sisters' fame, while the assumption is that there was no good to be interred with his bones. But there was some good to his credit, after all, and a study of his life is requisite to the complete comprehension of the Brontë tragedy. He presents a psychological problem of intense interest, and it is to be regretted that we do not know more of him than we do. Our information about him is meagre when compared with that about his sisters. Charlotte, the most copious of correspondents, but rarely refers to him in her letters, and at the time of his death, when memories must have welled up, she had nothing pleasant to say of him.

Under a mistaken sense of shame, she found any allusion to him painful.

Branwell had a liberal endowment of the unique Brontë genius—genuine genius—a clouded fire at his heart like that of the opal, with all the ill-luck that is associated with that magic stone. From his earliest years he gave token of this. Mrs. Gaskell tells us that he was as a boy “of remarkable promise and in some ways of extraordinary precocity of talent.” When, at seven years of age, his eccentric father put him behind a mask, in order that he might speak freely and without timidity, and asked him which was the best way of knowing the difference between the intellects of men and women, he replied (and his reply displayed wisdom that should be insisted on to-day): “By considering the differences between them as to their bodies.” His sisters in those days regarded him as the brightest ornament and hope of their family, and Sir Wemyss Reid assured us that when he was about seventeen he had intellectual gifts of the highest order and a winning personal charm. “Ambitious, clever,” said Sir Wemyss, “he seemed destined to play a considerable part in the world. Even his father’s dull parishioners recognised the fire of genius in the lad, and long years after he had gone the most vivid reminiscences and fondest memories of the oldest people in the village centred in the hapless youth.”

During adolescence Branwell must have presented a striking and attractive figure. Short of stature—the shortness due no doubt to shortage of food in childhood;

for his father was tall and his mother of average height—with radiant red hair (Charlotte called it tawny) and a handsome face lit up by Celtic animation, bright and vivacious in manner and of exceptional conversational powers enriched by copious literary allusions, he impressed all who met him by his ability, versatility and range of information. Moved by his artistic temperament, he studied music and attained to some skill in painting, for his portraits and water-colour sketches, notwithstanding their technical imperfections, are not without dignity and merit. And not only was he painting at this time, but pouring forth, as bounteously as his sisters, poems, tales, adventures, tragedies, not inferior in quality to theirs, and which, allowing for the greater precocity of their sex, might be regarded as of even higher significance. His poems with certain personal characteristics reveal the same creative imagination that is seen in those of his sisters, the same melancholic tendency—in him it became ultimately sepulchral—the same love of Nature in her wilder moods that became an obsession with Emily and moans and surges through the pages of *Wuthering Heights*. Humour Branwell had, the same Northern humour that spurts out in *Wuthering Heights* in the saying of the old Calvinistic farm servant, the same humour, but less grim and more broad and genial. Without that humour we may be sure he would not have been summoned, as he often was, by the landlord of the “Black Bull” to discuss a bottle of wine whenever a traveller arrived who required to be amused.

The wonder is that Branwell Brontë was what he was,

considering his "upbringing," as it is called in Scotland. Losing his mother—a gentle, graceful-minded Cornish woman—when he was five years old, he was deprived of those maternal influences that are most precious in after life, and left to the guidance of his father, who was eccentric to the verge of madness. Mr. Brontë was a man of soldierly spirit and high principle, but passionate and at the same time rigid, with Spartan ideas of discipline, and lacking that fine sympathy and delicate perception which would have enabled him to make his family happy. He held himself aloof and shut himself up in his study. There was little room in his house for gaiety or amusement. The children, without companions of their own age, grew up silent and reserved under the prim but not unkindly regulations of a maiden aunt and with the society of uncouth but good-natured domestics.

Branwell had not even the poor educational advantages which his sisters enjoyed. His father undertook his education, giving him a few hours of instruction daily, and when these were over he was free to disport himself with the rough boys of the village. He was practically self-educated. Untrained as he was, and having regard to his predilections, the decision arrived at when he was eighteen that he should devote himself to the career of an artist was a wise one, and one must regret that it was not adhered to. Had he succeeded in gaining admission as a pupil at the Royal Academy he would, in association with kindred spirits in London, in all probability have developed his artistic or literary abilities in a systematic

and remunerative way. But that was not to be, and he had to return to Yorkshire, to unstimulating lessons in portrait painting at Bradford, to loafing at home, to the drudgery of a tutor in a private family at Broughton-in-Furness, and to the soul-crabbing occupation of a booking-clerk at a small country railway station. It was at this period of his life—when he was from eighteen to twenty-four years of age (the danger zone in such matters)—that he gave way to habits of intemperance. Conscious of power and faculty, disappointed and drifting without any definite scheme of life, he lost his mental balance, but his excesses were social and occasional and did not abridge his mental activity, for some fine literary work was produced at this time. It has been the fashion to disparage his literary remains. Miss Robinson has said that his lyrics had “the pulpit twang” and were weak and characterless effusions, and Mr. Clement Shorter would have us believe that “neither his letters nor the various manuscripts of his that have survived show any of the talent that his sisters were at one time disposed to attribute to them.” But anyone who reads his letters to Wordsworth, to Hartley Coleridge, to Blackwood and to Leyland, written at this time, will surely arrive at the conclusion that it was his sisters who were right and Mr. Clement Shorter who is wrong, and anyone who reads his poem “On Caroline,” his sonnet to “The Emigrant,” and his “Translations from Horace,” will have doubts of Miss Robinson’s critical acumen. His letters are admirable in a literary sense—full of vigour and feeling and abounding in subtle

turns of verbal expression—as good as Charlotte’s at her best. And his poems—feeble, no doubt, sometimes—are the direct expression of the plenitude of his emotions; sometimes rise into noble imagery and always show felicities of versification. Space forbids illustrative specimens of his poetry here, but I may quote two verses from his poem on “The Afghan War” which make a stirring and appropriate appeal to all of British blood.

“ England rise! Thine ancient thunder
 Humbled mightier foes than these;
 Broke a whole world’s bonds asunder,
 Gave thee Empire o’er the seas.
 And while yet one rose may blossom,
 Emblem of thy former bloom,
 Let not age invade thy bosom—
 Brightest shine in darkest gloom!

While one oak thy homes shall shadow,
 Stand like it as thou hast stood;
 While a spring greets grove and meadow,
 Let not winter freeze thy blood.
 Till this hour St. George’s Standard
 Led the advancing march of time,
 England! keep it streaming vanward,
 Conquer every age and clime!”

It was after his twenty-fourth birthday that Branwell’s genius was frosted, while still immature and in only early efflorescence. Mortification and intoxication were both concerned in the check, and other irregularities of conduct which, although they have been magnified, were deplorable enough. He behaved with consummate folly, and exposed himself to just censure and misrepresentation.

It is impossible to deal with all or many of the misrepresentations of which Branwell has been the victim, but there is one that may be disposed of because it has been frequently repeated and places him in a very mean and despicable light; that is the statement that without any justification he laid claim to the authorship of *Wuthering Heights*. For this bogus claim Mr. Clement Shorter held him responsible, and it is in connection with it that Mr. Swinburne found him guilty of "lying pretensions." Now it is certain that he never advanced such a claim and that it was impossible that he could have done so as he never knew of the existence of the book. His sister Charlotte expressly says so. He died ignorant of the fact that his sisters had ever published a line. Long after his death two casual acquaintances affirmed that he had read to them a large part of the story in manuscript; and Mr. Francis Grundy, in his *Pictures of the Past*, said that Branwell had asserted to him that he wrote a great part of it. But Mr. Grundy's memory must have been at fault, for at the time the alleged assertion was made the book was not written; and the casual acquaintances must have been deceived by some resemblance between some of Branwell's own lucubrations and his sister's work. For years before his fall Branwell and Emily were on terms of affectionate intimacy and in constant communication, for Emily was more at home than the other sisters. They both had gloom and despondency implanted in their nature in unusual measure, and in their long moorland rambles Emily may have derived from Branwell's fertile brain

some of the weird fancies she embodied in her novel; but to say that Branwell ever tried to filch from his sister her well-won honours is a cruel and baseless calumny. It is not unlikely that some of the other discreditable legends that have gathered round Branwell's memory and besmirched it rest on an equally unstable foundation.

The Robinson incident is always regarded as Branwell's crowning iniquity. It was the part he played or was supposed to have played in it that, far more than his irregular habits, alienated his sisters' affections and led Charlotte to write of him so harshly during his declining days and at the time of his death.

Branwell did undoubtedly fall passionately in love with Mrs. Robinson, the wife of his employer, the Rev. Mr. Robinson, and the mother of his pupil at Thorp Green; a woman of many personal attractions, with whom he was in almost daily association for two and a half years. But so far there was nothing more reprehensible in his conduct than in that of his sister Charlotte, who fell passionately in love with her professor, M. Paul Heger, a married man, with whom she was associated as a pupil and teacher for one year and eight months at the Pensionnat at Brussels.

But it was in the subsequent phases of the passion that divergences took place. Charlotte, after a season of perilous temptation, grappled with her passion and overcame it. "I returned to Brussels," she wrote, "after aunt's death, against my conscience, prompted by what then seemed an irresistible impulse. I was

punished for my selfish folly by a withdrawal for more than two years of happiness and peace of mind." The neurotic little woman was, like Kilmeny, "pure as pure could be," and had an indomitable will, and after the pathetic struggle subdued her passion but did not extinguish it, for it flamed up again, innocently enough but ardently, in the pages of *Villette*.

The neurotic brother, on the other hand, made no effort to control his passion, but abandoned himself to its sway, with the result that he was soon plunged in madness; and the painful feature in his case was that his madness was not recognised, and so he was visited with stern condemnation when he required medical treatment and with contempt when he deserved pity. Misled, no doubt, by her Puritan prepossessions, Charlotte regarded her brother's acts as inveterate offences and heinous sins, and the two sisters, notwithstanding their deep affection for him, loaded him with reproaches, intended to be salutary but calculated to exacerbate his malady. Emily, however, who had a deeper discernment and could make even Heathcote an object of love, was, the Haworth people said, always good to Branwell. She treated him with unvarying kindness and never upbraided him. Mrs. Gaskell, taking her cue from Charlotte, and having no real conception of the state of Branwell's mind, is stringent in her judgment on "the weak and corrupted young man and on the woman whom she believed to have been his paramour and guilty accomplice"; but whom afterwards she had, not without some personal humiliation, to exonerate from blame.

I am inclined to think that the first two years of Branwell's sojourn with the Robinsons at Thorp Green were the happiest if not the most intellectually vivid of his life. He found himself in pleasant pastures with comparative ease. His good manners, his originality, his wit, his accomplishments secured to him many friends, and it is certain that his services were highly appreciated by his employers. Writing from Haworth at the Christmas of 1844, after he had been two years at Thorp Green, Charlotte says: "Anne and Branwell have just left us to return to Thorp Green; they are both wonderfully valued in their situations."

It was only during his last six months at Thorp Green that Branwell became infatuated with Mrs. Robinson, whose kindness and condescension he mistook for a return of his affection. He had never been in love before, and hugged his new emotions. At last he must somehow have revealed the state of his feelings to the lady; but there can have been nothing outrageous in his advances, for Mrs. Robinson made no complaint to her husband until Branwell had gone home for his holidays, and then it was that he was peremptorily dismissed.

Branwell's infatuation for Mrs. Robinson was morbid and not vicious, from the first. It was egotistic and wildly extravagant. He thought he had received encouragement where he had had none. He believed that this virtuous and highly conventional matron, seventeen years his senior, had offered to elope with him or to wait for him and marry him on her husband's death. His health was beginning to give way, and this

wild phantasy was the initial stage of the disease which steadily progressed and carried him off three years later. Mr. Clement Shorter thinks that Branwell was taking opium at this time and that that may account for his indiscretions; but there is no evidence of that, and opium is not erotic in its action. Mrs. Gaskell says that it was only during the last three years of his life—that is to say, after he had left Thorp Green—that he resorted to opium habitually by way of stunning conscience. It seems to me indubitable that it was tuberculosis, that deadly family familiar, that had got a grip of him. It carried off all his five sisters; it was firmly ensconced in the Haworth parsonage. A constitutional susceptibility to it would, in Branwell's case, be intensified by his former excesses, and the state of his nervous system thus induced would favour the development in a pronounced form of those mental disorders that so frequently accompany the disease.

Branwell's health had been failing for some time before his grand passion declared itself. In July 1844, Mr. Leyland recorded that his health was not as good as formerly, and his sisters noticed that he was excitable. Early in 1845 Anne observed in her brother a certain excitability and fitfulness of manner, a disposition to pass suddenly from gaiety to moody disquietude. A change had been coming on for six months, a change which in the beginning had scarcely been understood by himself but which, on the sudden shock of his dismissal from Thorp Green, speedily declared itself in phthisical insanity. The strange irregularities of his disposition

and the irresistible fervour of his suppressed and feverish passion deepened into monomania. He passed through what he described as “eleven continuous nights of sleepless horror,” when his mind reeled and shook in agony, intense and ungovernable, and then he developed positive delusions. He believed that Mr. Robinson had threatened to shoot him, that he had received letters from the lady assuring him of her devotion to him, that her husband’s property was left to her on the express condition that she never saw him (Branwell) again, and that she was consequently distracted with sorrow and despair—all which was baseless imagination. He became deeply despondent, accused himself of the blackest guilt and treachery, repeatedly threatened suicide and violence, even against his aged father, and became irascible, suspicious and morose, exhibiting the familiar mental symptoms of phthisical insanity, which are summarised by Sir Thomas Clouston as “a gradual alteration of disposition, conduct and feeling in the direction of morbid suspicion, of irritability, of moroseness, and of unsociability.”

It might be objected to the suggestion that Branwell Brontë was the victim of phthisical insanity that he did not, except in gradual emaciation, show any of the bodily signs of phthisis which were so conspicuous in the cases of his sisters, but it is characteristic of phthisical insanity that it masks the bodily symptoms of the disease. It often advances almost to the end steadily, without cough, breathlessness, pain, or manifest weakness. In Branwell’s case, too, the disease was still

further masked by his use of opium and by his intemperate habits. For the last three years of his life he resorted to opium because he said it made him forget better than drink, but he took drink too when he could get it. Mrs. Gaskell says he had several attacks of delirium tremens, but this is doubtful. He had, however, some convulsive seizures, and showed a steady loss of brain-power. Charlotte, writing to Miss Letitia Wheelwright in March 1849, announcing the death of her only brother, says he had been long in weak health and latterly consumptive.

It is curious to note that in the circumstances of his death Branwell Brontë displayed a mental attitude closely approximating to that displayed by his sisters Emily and Anne. Under the influence of the *spes phthisica*, as it is called, or the delusive hopefulness which so often lights up the gloomy pathway of the disease and even the entrance on the Dark Valley, they all three essayed to despise death and set it at defiance. Not one of them died in bed. Pallid, wasting visibly, suffering acutely, Emily resolutely refused to see a doctor or to take remedies. On the day of her death she persisted in dressing herself and sat on the hearth combing her long brown hair. She came downstairs to the little back parlour and tried to do some work but grew gradually worse, and when she could no longer speak gasped in a husky voice: "If you will send for a doctor I will see him now." Alas! it was too late. Her sisters in an agony begged her to let them put her to bed. "No, no!" she cried. She tried to rise, leaning with

one hand upon the sofa; and then the cord of life snapped. She was dead.

In the last stage of her illness, Anne Brontë insisted on going to Scarborough, hoping that the sea breezes would revive her. She went there on May 24th, 1849, and died on May 28th. On Sunday, the 27th, she wanted to go to church, but being dissuaded from that, walked on the parade for a little in the afternoon. On the day of her death she rose at seven o'clock and performed most of her toilet herself and was assisted downstairs to the sitting-room, where she occupied an easy-chair looking serene and reliant. As the restlessness of approaching death appeared she was borne to the sofa, and there, saying to her sister, "Take courage, Charlotte, take courage!" she passed without a sigh from the temporal to the eternal.

Branwell Brontë died at Haworth with somewhat startling suddenness on September 24th, 1848. He had been growing weaker, but no immediate danger was apprehended, and two days before his death he was out in the village. He was only one day in bed, but a death-bed was not for him. Sharing his sisters' weird bravery, he resolved to die as nobody had ever died before; and when the last agony came on "he rose to his feet, as though proudly defying death itself to do its worst, and expired standing."

Poor Branwell Brontë! Much erring! But much afflicted, much maligned, much misunderstood!

BRAIN REST

THAT supreme organ, the brain, is, like every other organ and every organism endowed with life, in need of rest from time to time if it is to maintain its activity and existence. And the brain, being an organ possessing many functions and with a large range of activity, can take rest in several different ways. It can slacken its rate of action—that is to say, relax attention—and so in some degree recuperate its powers; it can shift the strain of action from one part of its complex mechanism to another by a change of pursuit and so give partial repose to some of the *quasi* independent parts of which it is composed; it can abandon itself to indolence and reverie, and so find in mere drifting some alleviation of fatigue. But these are not the kinds of brain rest about which I wish to speak. My subject is that kind of brain rest which we designate sleep, which corresponds with a state of more or less unconsciousness or suspension of the higher functions of the brain.

Now this kind of brain rest is enjoyed by all animals having well-developed nervous systems from day to day or from time to time; and in animals whose nervous systems are not well developed, and in which therefore the external phenomena of sleep cannot be readily recognised, there is still reason to believe that a rest state analogous to sleep occurs periodically.

Even in plants we have alternating periods of sleep and wakefulness. Plants feed by day and grow by night and the changes that take place in them in these respects are displayed in their movements. Any diminution in the intensity of light causes in plants a movement of closing, but an increase in its intensity a movement of opening, and these are the sleeping and waking movements in men and animals as well as in plants, for they, on going to sleep, close up, draw themselves together, and allow the flexor or bending muscles to predominate, and on waking stretch themselves out, pull themselves up erect, and allow the extensor or stretching muscles to assert themselves. Plant movements of the sleeping and waking kind are conspicuous in the *Mimosa pudica* or sensitive plant, and also in that “wee modest crimson-tipped flower” the daisy.

But it is in the animal kingdom that the evidence of alternating periods of sleep and wakefulness becomes clear and decisive. Speaking generally, it may be said that it is the pursuit of nourishment that determines, mainly, the habits of life. In an immense majority of animals light is essential to this, and so they work by day and rest by night, but in certain animals adaptations have taken place in respect to vision and in other matters, reversing the process. They work by night and rest by day. We see this in beasts of prey, who sleep by day and are active by night, and in timid animals, moths and mice, hedgehogs, bats, lemurs, etc., who find their food and their safety in darkness and only then venture forth. But beasts and birds, whether they sleep by day or night, resemble man in the outer phenomena of

sleep. They lower the eyelids and assume a position of ease and relaxation even although some of them remain standing. It has been questioned whether fish sleep, since they have no eyelids and remain poised in the water during the whole of the twenty-four hours. But Professor Sir Ray Lankester, by observations made at the Marine Laboratory at Plymouth, has satisfied himself that they sleep at night. They came to rest at the bottom of the tanks, and were not so quickly responsive to touch or intrusion of any kind as they are in the daytime. A star-fish near the surface of the water lies motionless, but on any diminution of light, as when a shade is held over it, descends vertically under the impression that bed-time has arrived.

As we ascend in the animal kingdom, sleep assumes more and more its human characteristics, and becomes more and more essential in proportion to the development of the higher nerve-centres, for the repair of which it gives time, but it is in man that we find it associated with new and special features, in connection with the lowering of the psychical activity of his pre-eminent brain.

In man, sleep is brain rest and has as its central and most important fact the more or less complete suspension of consciousness—during which recuperation of the *cortex cerebri* or active brain-tissue takes place. But sleep is not confined to the brain, invading in some degree every organ in the body. Every organ in the body must have rest, but the way in which that rest is taken varies in each organ according to the nature of the duties it has to perform. Prolonged intervals of sus-

pended functional activity in the case of the heart and lungs would mean death. And so they have to take their rest in snatches. The heart drops off to sleep for a fraction of a second between each of its beats. After the contraction and dilatation of its auricles and ventricles, there is an instant of standstill or rest and the intervals of this kind come, when summed up, to six hours in the twenty-four. The heart thus obtains its rest in a minute state of subdivision and goes on nid-nodding for a lifetime. The lungs, again, rest for an interval of one-third between each respiration, and so along with the respiratory muscles are off duty and at rest for eight hours in the twenty-four. Secretory glands, again, have their spells of work and repose, and all the viscera rest in due season according to their kind.

But all the viscera, whatever their special habits may be as regards rest, participate more or less in the rest of the brain. Whenever the vigilance of the brain is relaxed, the heart slows down, the pulse rate decreases, there is a fall in arterial pressure and in muscular tonicity, the respirations become fewer and deeper and tend to become periodic, that is to say, increase and decrease regularly in groups; the digestive glands show unabated activity, but some of the secretory glands give a reduced output, as, for instance, the lachrymal glands, causing as sleep approaches dryness that leads to rubbing the eyes, one of the familiar signs of a sleepy condition. None of the other organs give up work while the brain sleeps, but most of them go on working at a slightly reduced rate.

I have said that sleep consists in a temporary suspension of the functions of the higher nerve-centres, the brain, and an animal in a profound sleep is indeed in a condition analogous to that of another animal from which the cerebral hemispheres have been removed. A pigeon that has been thus experimentally treated appears as if permanently fast asleep. When a pistol is fired close to its ear it starts, when a bright light is brought near its eye the pupil contracts, when the vapour of ammonia is applied to its nostril it turns away its head, but the instant the stimulus is withdrawn it subsides into profound torpidity. Volition, memory, instinct are abolished; it does not touch food or drink placed near it, and if left to itself would perish of starvation. In animals of higher organisation than the pigeon, it is difficult to remove the cerebral hemispheres without sacrificing life, but when what is called decerebration has been successfully performed, the animal presents the same general phenomena noticed in the pigeon, and remains in a deep and protracted Rip Van Winkle sleep. Bereft of its cerebral hemispheres, it is reduced to a lower level of existence or automatism, and while the heart, lungs and liver carry on their work, though irregularly and at a reduced speed, it shows no sign of mental activity.

Now if this suspension of the functions of the cerebral hemispheres or cortex of the brain is the essence of sleep—and the fact is attested by experiment and common experience—what, it may be asked, is the condition of the brain during this suspension? Many theories, chemical, histological, physiological, and psychological, have been advanced to account for the causation and

phenomena of sleep. Of its intimate nature we are still really ignorant, but of certain conditions that accompany it we are now well assured. Perhaps the most obvious or generally recognised of these is cerebral anæmia or a diminished flow of blood through the brain. The cerebral hemispheres forming the bulk of the brain contain less blood during the sleeping than during the waking state, and I wish to insist on that fact, for the popular notion still seems to be that the opposite is the case, and in some standard physiological works of three-quarters of a century ago it was taught that sleep depends on a plethora of blood within the cranium, or congestion of the brain. The late Dr. Carpenter said the first cause of sleep in order of importance is the pressure exerted by distended blood-vessels upon the brain. Sir Henry Holland declared that a degree of blood pressure is essential to perfect sleep. Dr. Marshall Hall affirmed that sleep is induced by contraction of the muscles of the neck, constricting the large veins there and so preventing the free return of blood from the brain, and Mr. George Henry Lewes in his *Physiology of Common Life* summed up the matter thus: "Sleep is produced by congestion of the brain."

It is not difficult to understand how this theory of the condition of the brain in sleep arose. It had been noted that whenever there was fracture of the skull with depression of the bone there was a suspension of consciousness such as is seen in sleep—a state of insensibility which was relieved when by surgical measures the depressed bone was raised or removed and the pressure taken off the brain, and that in cases of death from

apoplexy, which is characterised by coma or heavy sleep, there was as revealed by *post-mortem* examination engorgement of the veins within the skull, with dark blood or compression by a clot of blood. And so it was inferred that the same condition—congestion or compression of the brain—which caused the morbid sleep of coma and concussion, when present in a less degree, produced natural sleep. The brain's functions were, it was supposed, squeezed out of it like water from a sponge.

But coma and the insensibility of concussion are very different things from sleep, and it is now clear that the congestive theory of sleep is untenable. The brains of animals have been subjected to direct observation. A circular piece has been removed from the skull and a watch-glass cemented over the opening so that changes in the brain could be seen. Under such circumstances it was noted that when the animal was awake the vessels which ramify on the surface of the brain were moderately distended, but that when it went to sleep they were partially emptied, the smaller ones being no longer visible. During wakefulness the brain was flushed and turgid, during sleep shrunken and pallid. The same changes take place in man. I have myself many times watched the fore-part of the brain of a miner who had had a piece of the frontal bone stove in in a pit accident and subsequently removed, and I have seen his brain, which as he lay asleep was blanched and heaved gently with a scarcely perceptible motion, at once, when he was wakened, swell out and pulsate strongly.

The behaviour of the brain under sleep-inducing remedies gives evidence to the same effect. When

chloral, opium, sulphonal or other sleep-compelling drugs are administered to an animal with its brain on view, there is seen, after a temporary turgescence of the veins, a gradual diminution of the blood in the organ notified by a change of colour and contraction of the minute arteries, and this fact has been taken advantage of in surgery, for in those remarkable operations for removal of tumours from the brain it has been customary to give a dose of morphia shortly before the operation, so that the danger of hæmorrhage when the brain substance is cut may be diminished. The vessels contracted by the action of the hypnotic do not bleed as they would do if not under its control, an artificial sleep with bloodlessness of the brain having been established.

But, further, the comparatively bloodless state of the brain during sleep may be seen, yes, almost directly seen, in persons who have not undergone any operation and have entire skulls. There is at the back of the eye a little prolongation of brain substance spread out, called the retina, on which visual impressions are received. By means of the ophthalmoscope the retina can be inspected, and by the use of this instrument with patience and dexterity it has been shown that during sleep there is contraction of the arteries and no longer the pink glow of waking moments when it is full of blood. It has been argued that the volume of blood in the brain is in all physiological conditions but slightly variable, but it is variable to some extent, and it is certain that arterial anæmia combined with venous congestion may occur; for anæmia or bloodlessness of the cortex may be counterbalanced by a dilatation of the vessels at the base

of the brain and of those of the cutaneous surface generally.

Other proofs that during sleep there is a diminished flow of blood in the brain might be adduced. Direct compression of the carotid arteries in the neck has been practised by an instrument, a somewhat hazardous experiment which I would not recommend as a soporific, and the supply of blood to the brain being thus retarded, deep sleep has ensued. Detention of an undue amount of blood in one limb so that the brain is badly supplied has the same effect. If a large air-tight indiarubber bag called Junod's Boot be fastened round the thigh, and a vacuum be created in it by means of an air pump, overpowering drowsiness is brought on. The blood from the parts of the body still under atmospheric pressure tends to flow into the part that has been freed from it, and so the leg within the boot becomes enormously distended with blood while all other parts, including the brain, become anæmic. Analogous to Junod's Boot, in a mild degree, is the domestic remedy of a mustard foot-bath for sleeplessness. Excessive loss of blood from hæmorrhage is accompanied by mental torpor and sleep, and so is any impoverishment of the blood from disease. The drowsiness that follows a heavy meal is probably due mainly to the mechanical effect of a dilatation of the blood-vessels of the viscera, and the consequent diminution of the blood-flow through the brain.

There are two conditions, however, which apparently favour a flow of blood to the brain, and which yet induce sleep and about which a word must be said: these are posture and cold.

One of the ways of courting sleep is to lay down the head. All men of all races do it, and the dependent position of the head must surely augment the flow of blood to the brain. Yes, under certain circumstances. As long as the body remains erect, to hold down the head is to produce hyperæmia of the brain, and a distinguished physician, Dr. Lander Brimlon, not long ago gave us an illustration of this. He said that at one period when terribly overworked he found on many occasions when writing late at night his ideas forsook his jaded brain. Everything became blank and the pen stood still, but he could always resume his thread of thought and go on writing by laying his head down on the table, and he got into the way of writing with his head resting on a pillow on the table. The exhausted brain struck work while only receiving the modicum of blood supplied to it while the head was held up, but resumed work when it got an increased supply on the head being laid down. An irreverent friend to whom he repeated this experience said: "That is very interesting and accounts for what I never understood before—the acuteness of the Yankees. It evidently comes from their habit of sitting with their heels on the chimney-piece and so encouraging the flow of blood to their brains." But the irreverent friend overshot the mark, for if the body is dependent as well as the head, the brain blood supply is not increased. Whenever the body assumes a recumbent position there is slowing of the heart's action, the difference of number of beats between the erect and recumbent positions being eight or ten per minute, and this slowing means that a smaller number of jets of

blood are sent through the brain in a given time. Then with the composure of the body in recumbency there is also composure of the mind, and a reduction of sensory stimuli, a dilatation of the blood-vessels of the skin and a fall of arterial pressure—the opposite of what occurs during increased mental activity and sensory stimulation, when there is constriction of the vessels of the skin and a rise of arterial pressure.

Then, as to cold, it is certain that reduction of temperature causes the blood-vessels on the surface to contract, and the blood driven from the surface accumulates in the internal organs, the brain amongst them, and it is equally certain that severe cold brings on drowsiness. The records of Arctic exploration and mountain climbing abound with instances in which men exposed to intense cold have been overtaken by unconquerable drowsiness and have laid themselves down to sleep in the snow, although well aware that the sleep must be their last. But the internal congestions caused by cold are of dark venous blood. Cold slows the action of the heart, it does not dilate the arteries, it contracts them. What it does is to drive the used-up venous blood into the deep veins and cause stasis, and so the drowsiness it induces is akin, not to natural sleep, but to coma.

All known facts point to an anæmic or comparatively bloodless condition of the brain during sleep, and so the question arises, Is this anæmia the true cause of sleep? Does the brain sink to rest because its blood supply fails or is cut off by vaso-motor control when we go to sleep naturally, just as it is in the sleep artificially induced when the carotid arteries are compressed? Certainly

not. The blood-vessels are not the tyrants of the brain, but its obedient servants. They do not dominate, but minister to it. They contract not at their pleasure and so force sleep upon the brain, but because the brain no longer makes such heavy demands on them. Every secreting gland in the body when functionally active gets an increased supply of blood and when functionally passive a less supply, but the blood supply is regulated, not by the caprice of the vessels, but by the requirements of the glands intimated through their nervous apparatus. All the muscles when they are doing work get more blood than when they are idle. It is not the flow of blood to the muscles that determines our muscular movements, and so the brain contains more blood when it is doing work than when it is at rest; but it is not the irrigating blood tide in its ebb and flow that determines consciousness or slumber. No doubt the brain cannot work without blood, and so if the current is interrupted or materially reduced by any external cause it must rest. No doubt it cannot rest without some reduction in the current of arterial blood circulating through it, and so long as that current is by any external means, such as disturbance of the heart's action or fever, kept up at a maximum it must remain active. But under normal conditions, and within certain limits, the brain nicely regulates its own circulation in every region and does not owe the rest it enjoys to the benevolent interference of the blood-vessels, but to autonomous laws. For the ultimate cause of sleep we must look to changes in the brain itself.

What are these changes? Candidly we do not know.

I am afraid in this matter we have not got much further than Molière's Empiric who ascribed sleep to a "Vis dormitiva." This we can say, however, that there are two factors in sleep, the cessation or diminution of the impulses reaching the brain from without through the sense organs and a reduction in the excitability of the brain substance itself.

The withdrawal of all extrinsic stimuli, of sights, sounds and sensations of every kind, is a most influential condition of sleep; thus do all men and animals court it, and thus in certain morbid states it can be induced with mechanical precision. Strumpell has recorded the case of a boy who, by a paralytic affection, had been deprived of all his senses except sight in the right eye and hearing in the left ear. Whenever this boy's seeing eye was bandaged and his hearing ear stopped, he dropped off to sleep instantly and could not be awakened by shaking or in any way but by calling into his left ear, or admitting light into his right eye. But, important as is the cessation of the bombardment of the brain by sense-impressions to the induction of sleep, it is powerless in certain states of the nervous system. If the brain be kept over-excited by worry, harassment or stress of work, no degree of darkness, silence and tranquillity, as all strenuous brain-workers know in these strenuous times, will insure the advent of the "sweet restorer," and if, on the other hand, the brain be thoroughly exhausted, by mental or physical fatigue, no urgency of sensation will banish it. Dr. Hammond, reporting on the War in the United States, says: "I have frequently seen soldiers sleep on horseback during night marches and have often

thus slept myself. During the battle of the Nile many of the boys engaged in handing ammunition fell asleep notwithstanding the noise and turmoil of the action, and Damiens slept on the rack in the intervals of torture.”

Shakespeare, apostrophising sleep, says :

“ Wilt thou upon the high and giddy mast
Seal up the ship-boy’s eyes and rock his brains
In cradle of the rude imperious surge ?

.
Can’st thou, O partial sleep ! give thy repose
To the wet sea-boy in an hour so rude ;
And in the calmest and most stillest night
With all appliances and means to boot,
Deny it to a king ? ”

But of more importance than sensory impressions in relation to sleep is the sensibility of the brain substance. It is only when that is diminished that sleep ensues, and its diminution corresponds to cerebral fatigue, which is due to some chemical change, probably to the accumulation of waste products in its blood and tissues with exhaustion of its intracellular oxygen, the expenditure of which in waking hours is greater than the intake. The brain is continually undergoing change of substance ; its atoms, molecules or particles are in perpetual flux, and in addition to its actual living texture there are always present in it nutrient material in process of assimilation and waste matter in process of removal. Renovation is always going on, foodstuffs are always being converted into nerve-tissue and nerve-tissue is always being broken down into *débris*. But when the brain is called upon to do active work, the change in its substance is increased, its atoms, molecules or particles

are quickened in their movements and waste goes on more rapidly than repair. Destruction predominates over construction, and the rate of exhaustion of the brain will depend on the degree in which expenditure exceeds income. But the action of the brain is explosive, and with each sensation, feeling, idea, effort of will, there is a sudden generation of waste products which are discharged into the interstices of its living frame-work. And the waste products, including carbonic acid and lactic acid and other chemical bodies, are injurious to the tissues. The brain, like every other organ in the body, and indeed like the body as a whole, in the very act of living and energising, manufactures substances that in large quantities are poisonous to itself. The mechanism becomes clogged up by waste products or toxins that cannot be removed as rapidly as they are formed, while the brain is actively at work, and hence weariness, fatigue and ultimately sleep. All machinery must be stopped while repairs are going on.

In the muscles functional activity is accompanied by the formation of acid waste products, which, if not removed as rapidly as they are formed, cause a diminution and finally a loss of irritability. In the muscles kept in constant action we have weariness, fatigue, exhaustion. If the muscles of a frog's legs are stimulated by an electric current applied to the nerve, the contraction, at first vigorous, becomes feebler and feebler and ultimately ceases altogether, in spite of continued stimulation, the muscle having become exhausted, but after a period of rest, giving time for the removal of waste products, the muscle recovers its contractibility. The

hunted hare dies, not because of want of breath, not because its heart stands still, its store of energy being exhausted, but because its poisoned blood, loaded with waste tissue, poisons its brain and its whole body. So also the schoolboy, urged by athletic frenzy to go on running after he has become distressed, ultimately deadens his brain, falls perhaps dazed and giddy, as in a fit, rising perhaps half-conscious and struggling on for a bit until comes final collapse, poisoned by poisons of his own making. Schoolmasters should study the phenomena of fatigue in order to understand that grave evils from excessive muscular exercise may happen to boys who have been certified by the school medical officer to have sound hearts.

With the nervous system it is as with the muscles. Any particular part of the nervous system called into play gradually becomes tired, distressed, and if pushed too far strikes work. Under work there is a gradual loss of irritability in the cortical cells of the brain. They grow feebler and feebler, and become irregular in action, under the toxic influence of waste products and finally there must come compulsory sleep, although normally the accumulation of waste products is not carried to an extreme, since it is our human habit to court sleep when the sensation of sleepiness declares itself by withdrawing ourselves from excitations, mental or bodily.

But with reference to brain fatigue and sleep from the accumulation of waste products, it must be borne in mind that these products are not all, or mainly, derived from the disintegration of its own tissues. The toxins of fatigue wherever produced by local overwork spread

themselves over the whole body. It has been often demonstrated that mental effort is followed by muscular enfeeblement, while severe physical exertion results in a transient reduction in the excitability of the brain. The impairment of mental energy by muscular exercise has been demonstrated by measurements showing reduction in the power of memory, discrimination, association and recognition after a four hours' walk. It is in accordance with current belief that a boy over-wearied with mental work will find recuperation in cricket or a cycle run, but that is bad physiology. The boy should not be *over-wearied* with mental work, to begin with, that is the cardinal fact, and when he is so should have brain rest and bodily rest as well. Gymnastics are not restoratives where there is mental fatigue. As Mr. Wells says in *When the Sleeper Wakes*, "Body fag is no cure for brain fag." It is a schoolmaster's fallacy that physical exercise lessens the need for cerebral repose.

It seems probable that some of the phenomena of sleep may be explained by fatigue of one particular nerve-centre—the vaso-motor centre in the medulla oblongata which controls the calibre of the blood-vessels. This centre is in constant action during waking hours, the continued flow of sensory stimuli and the constant activity of the brain act reflexly on it and through it cause a constriction of the blood-vessels of the body, particularly of the skin, by means of which the blood-flow through the brain is maintained at an adequate velocity. But in consequence of its varying but constant activity this centre becomes fatigued, stronger and stronger stimuli are required to enable it to keep up

the general blood pressure, and eventually its effect on the blood-vessels becomes insufficient to maintain an adequate flow through the brain, and unconsciousness or sleep results even against our desires, as is shown by the experience of those who have attempted to keep awake much beyond the usual period.

But when fatigue has asserted itself and the brain has become anæmic, what, it may be asked, is the state of the cells of the brain, which are its active elements? Sleeping and waking are two different states of the brain—allotropic states they might be called—for some change takes place in the relations of the cerebral neurons which may be compared to the change in the coupling of the atoms when a piece of yellow phosphorus is transformed into the red, amorphous variety. Carbon, graphite and the diamond, diverse as they are, are all different phases of the same element, and the wakeful, sleeping and dreaming conditions, diverse as they are, are all phases of the same brain corresponding to different couplings of the cells of which it is built up. These cells, which lying in strata make up the grey matter of the convolutions of the brain, give off a number of branches or filaments, and have been compared to stars or spiders with outstretched legs. During ordinary functional activity the cells show a notable protoplasmic turgescence with great increase in size, while during fatigue they undergo progressive decrease in size, with shrinking of their nuclei. What the state of these cells is during sleep, as you will readily understand, it is and must be immensely difficult to ascertain; but it has been conjectured that it consists in an amæboid motion in them

with a retraction of their dendritic processes or branches. It was at one time thought that these dendrites with their plumules formed connecting links running from one cell to another, but it has been conclusively proved that this is not the case. Each cell gives out a number of branches which diverge centrifugally, but these branches do not coalesce with those from other cells, making up continuous filaments, though they may touch from time to time. They meet each other and are in contact, but remain distinct. Adjoining cells are in relations of contiguity, but not of continuity through their processes. Assuming that these processes or arborisations given off by the cells on every side are contractile, it has been supposed that sleep is caused by their retraction, which results in breaking off of the connections between their gemmules or points of naked protoplasm, and thus withdrawing the brain-cells from the possibility of external stimulation. Conductivity, according to this hypothesis, is re-established on awakening by the prolongation of the processes again re-establishing physiological connections. Numerous observations have not yet demonstrated the fact of the retraction of the dendritic processes, and the neuron theory remains an ingenious speculation and a very useful working hypothesis.

Whatever the proximate cause of sleep may be, the most obvious purpose which it subserves is regeneration and repair of the higher nerve-centres. The immediate molecular changes on which it depends, occurring in consequence of fatigue and in obedience to a law of periodicity, afford opportunities for building up the

brain. The sense of refreshment which we all feel after a good night's rest is proof positive that renovation has taken place in the nervous system.

And here a caution is necessary, for while it cannot be gainsaid that the nutrition and repair of the brain go on chiefly during sleep, it is certain that they do not go on then only, and that the whole amount of sleep taken is not devoted to cerebral reconstruction. In prolonged cases of sleeplessness or insomnia, repairs of a kind must be carried on during wakefulness, and the amount of sleep required is by no means equivalent to the amount of active cerebral work done. Many of the lower animals spend a far longer period of their lives in sleep than man does, and the lower and more animal races of mankind—for example, negroes—indulge more largely in sleep than do the higher and more intellectual races, for example, the Anglo-Saxon. Within each race the more intellectually active members take, as a rule, less sleep than the more dull and torpid. Sleep is to some extent a racial characteristic. A number of years ago Dr. Robert Grieve made some special observation for me at Bahia, and his conclusion was that the East Indian coolies are much less somnolent than the African negroes—that is to say, they can do with a much less amount of sleep and continue to work efficiently and do not so readily drop into a doze at any moment when they are at rest as is the manner of the negro. The lower and more animal activities of the nerve-centres are more constantly on the strain and involve more wear and tear than do its intellectual activities and so largely determine the amount of sleep required, and waste

products from the viscera and muscles circulating in the blood force upon the brain sleep in excess of its own immediate requirements just as does a narcotic drug.

But the nutrition and repair of the brain are not the sole purpose for which sleep exists. Far from it. In each individual the period of maximum mental activity, when wear and tear and the need of nutrition and repair must be at the highest point, is that of minimum sleep indulgence. It is in babyhood and in senile decay that most sleep is needed and in the zenith of manhood that least is required. It becomes clear, therefore, that sleep is related to the formative as well as to the functional activity of the brain.

The drowsiness and prolonged sleep periods of old age depend on special causes connected with dissolution upon which I need not here enter, but as regards the sleepfulness of early life I would point out that it is always in proportion to the activity of brain growth. From birth, when the brain is growing rapidly and when life is almost a continuous sleep, onwards till early manhood, when brain growth is at an end, the increment of brain growth progressively diminishes, and *pari passu* with the diminution in the rate of brain growth goes a reduction in the demand made for sleep by the brain. It may be said that eight hours sleep in the twenty-four, an allowance which is suitable to an average adult man with a fully developed and actively working brain, is reparative sleep, and that all beyond that amount prior to maturity—an amount varying from one to sixteen hours in the twenty-four

—is germinal sleep and sleep ministering to processes of growth.

The sequence of events during the incursion of sleep is probably this: a number of nerve-centres are exhausted, from having used up their intramolecular oxygen, and become functionally inactive and anæmic; the whole brain is reduced in sensibility by the presence of waste products; the shutting out of external impressions by the closing of the eyelids, avoidance of noises and quiescence of the limbs and the tranquillity of the motor centres connected with the maintenance of equilibrium secured by recumbency diffuse the state of functional inactivity and anæmia still further, and the circulation throughout the whole organ is soon reduced to a point that is incompatible with functional activity, but sufficient for nutritive purposes. And it seems that nutritive processes go on in the brain more freely during the suspension of its functions. Not that nutritive functions are in abeyance during the day. No doubt they go on then more or less throughout the whole brain, and in some regions briskly, but in those centres where functional activity is pretty constantly kept up during wakefulness, it is only during sleep that nutrition can be adequately carried on, and especially that kind of nutrition upon which growth depends.

Plants feed by day and grow by night, and speaking generally the same is true of the brain. Most of a child's actual body growth is done in bed.

If, then, brain growth goes on chiefly during sleep, the question of the proper duration of sleep becomes one of great interest and significance to all who are engaged

in education. To deprive the young of a sufficiency of sleep must be to run the risk of stunting brain growth and mental development.

Some thirty years ago I published a table showing the average amount of sleep required by children at different ages, and looking over that table now in the light of further experience I would not amend it in any particular.

HOURS OF SLEEP

Required at Different Ages

At birth	24 hours.
At one month	22 „
At two months	20 „
At six months	19 „
From one to five years	14 „
From five to seven years	12 „
From seven to ten years	11 „
From ten to fifteen years	10 „
From fifteen to twenty years	9 „
Throughout adult life	8 „

No doubt children vary in their sleep requirements. Some need more than others, but if healthy brain growth and bodily vigour are to be maintained, a vast majority of children should have the amounts I have indicated. An insufficiency of sleep means a reduction of working capacity, dulness on the one hand or instability on the other, and in either case impaired educability and a risk of disease. No fears need be entertained of giving an excess of sleep to children and so steeping their brains in sluggishness. The young and innocent and healthy brain duly refreshed springs into activity and welcomes the dawn. It is the misused or jaded brain that seeks

refuge in slumber long drawn out. A healthy boy should enjoy his sleep as he does his food, but he won't surfeit himself on it as he might do on jam tarts. Tom Hood realised all this:

“ I remember, I remember
The house where I was born,
The little window where the sun
Came peeping in at morn ;
He never came a wink too soon
Nor brought too long a day ;
But now, I often wish the night
Had borne my breath away.”

John Locke, who had the benefit of a medical education, and was indeed an accomplished physician, in his *Thoughts on Education*, published two hundred years ago, said: “ Of all that looks soft and effeminate, nothing is to be more indulged in children than sleep. In this alone are they to be permitted to have their full satisfaction, nothing contributing more to the health and growth of children than sleep.”

Do we in these days indulge our children to their full satisfaction in sleep? Do our children get the amount of sleep that is requisite for brain health and growth? I am afraid many of them do not. There are well-regulated homes in which wise old traditions prevail. There are enlightened teachers who have made themselves acquainted with physiology, and regulate the lives of their pupils accordingly, but the general tendency has been in the hurry, scurry and struggle for existence of the times, and under the pressure of examination and scholastic emulation and rivalry to curtail the sleep of our boys and girls unduly.

Moved by a particular case that was brought under his notice, Dr. Theodore Acland, twenty years ago, investigated the question of the hours of sleep in public schools, and showed clearly that in many of these schools the question of sleep had been too little considered, and that the hours of sleep given to the younger and often to all the boys were too short. He obtained returns from forty great schools in England, and in every one of these I would say the number of hours of sleep, or rather more correctly, the number of hours spent in bed, was short of the proper standard. In a large number of these schools the younger boys, who ought to have had ten hours sleep, were having eight or eight and a half hours, in one case only seven and a quarter. In not one of them was the amount of sleep given to the upper boys adequate according to the estimates of the medical and physiological authorities whom Dr. Acland consulted. There were, of course, wide diversities in different schools, but everywhere the exigencies of an overloaded and compressed curriculum or the dread of self-indulgence and slackness had led to the cheating of Nature of her fair proportion to some extent. The schools did not make provision for enough sleep in their scheduled hours, but the deficiency was often made greater by further curtailment of rest through lights and talking being allowed after bed-time, through want of proper darkening of the dormitories and through the noise made by the older boys after the younger boys had gone to bed. There was little recognition of the fact that more sleep is required in winter than in summer.

Of course, Dr. Acland's conclusions were disputed. He was told that the existing system must be all right because it had no evil results, and one correspondent argued that the small boys could not possibly want more sleep than they got because they never complained to the headmaster. But are there no evil effects, I would ask, which may escape the notice of masters who have had no psychological or physiological training? Are there not deferred evil effects which do not show themselves at once but are cumulative and come to the surface after the boy has left school?

Are all the boys at our public schools just as bright, alert and braced up as they might be?

An obviously clever and observing mother told us not long ago in a monthly magazine that the boys at one great public school were not up to the mark as regards muscular tonicity. "I saw them," she said, "all collected together, and why, oh! why are they allowed to slouch about so, with their hands in their pockets, heads poked forward and shoulders sunk?" Well, if this is correct I should be inclined to think that these young gentlemen are not adequately slumbered. Lack of muscular tonicity may have several causes, but sleep starvation is undoubtedly one of them.

"I ask," says Sir George Darwin, "whether lack of due sleep is not responsible for much of the prevalent slackness in schools of which there is so much reason to complain?"

"From all sides," said Dr. Acland, "I have learned that short hours of sleep do press heavily on the younger boys, and are of no possible advantage to them. None

are more emphatic on this point than the masters of private schools who keep in touch with the boys after they leave, and especially those who have sons of their own at public schools from whom they hear the truth."

Mr. Bourne, Fellow and Tutor of New College, Oxford, has borne witness that there is a general consensus of opinion that public school boys have deteriorated, and are deteriorating in mental vigour and intellectual interest, while we hear of no such complaint of the boys educated at the great day schools. "If public school boys," he goes on, "have drifted towards intellectual inefficiency it is not because they have less work to do. The hours of work are longer than they were twenty-five years ago; the tasks are harder and more numerous, examinations have been multiplied, school discipline is more effective, and the standard of school games has been so much raised that they have become a labour and anxiety, rather than a recreation. Many parents will testify that their boys return for the holidays pale, listless and worn out, and recover surprisingly during a few days of home life. May we not suspect that modern schoolmasters have driven boys too hard and by enforcing an excessive quantity of work and play have produced staleness of mind as well as some degree of physical deterioration? One thing we may be quite sure of, that the number of hours of sleep that may have been sufficient twenty-five or thirty years ago are altogether insufficient for boys who are driven at such high pressure, both mental and physical, as they are now. I could give instances of bright and hard-working boys who have gone at the age of thirteen from preparatory

day schools to some of our leading public schools and have either broken down or have relapsed into intellectual apathy under the stress of earlier hours and longer and harder tasks at the latter institutions.”

Dr. Acland's representations, *On the Hours of Sleep in Public Schools*, were made many years ago, and were strongly supported. The Section of School Hygiene at the London Conference of the Royal Institute of Public Health passed the following resolution: “That the hours of sleep allowed to boys under sixteen years of age in some of our public schools are too short to enable the boys to attain their highest physical and mental development.” The discussion that arose has had, I have no doubt, a salutary effect. In some schools I understand that additions have been made to the sleep ration, but I do not believe that a satisfactory state of matters has yet been generally reached.

The School Medical Officers were with Dr. Acland, but where there is a conflict of opinion between the School Medical Officer and the Headmaster, it is not the former who will prevail.

But it is not only in our public schools that the evils of deficient brain rest are encountered. They permeate schools of all classes and are particularly rife in elementary schools in our populous urban centres. There is a depreciation of this physiological currency, and I fancy that the rest cures of which we now hear so often have in many cases to be undergone merely to make up the arrears of sleep in early years. The strain and stress of modern life, demanding increased brain activity, should be compensated by an increase of brain rest,

but we are stinted of that more and more. This is a sleepless age, and more and more owing to the cult of excitement and the pursuit of frivolity are we turning night into day. The sleep of the rising generation is being detrimentally interfered with, abbreviated and interrupted, and the inevitable consequences must be a rich crop of neurasthenia and mental enfeeblement in the future.

In many elementary schools in all parts of the country the teachers are, I feel sure, seriously hampered in their educational work by a deficiency of brain rest in their pupils.

Miss Alice Ravenhill instituted an inquiry on the subject of the hours of sleep in boys and girls attending elementary schools both in town and country. She obtained statistical information from London, Birmingham, Manchester, Liverpool, Stoke-on-Trent, Newcastle-on-Tyne and Bristol, and from Shropshire, Staffordshire, Warwickshire, Dorset and Durham, and no pains were spared in verifying and analysing the returns received. Her deductions are based on a total of 6180 children between the ages of three and thirteen, of whom 3500 were boys and 2680 girls. Her principal deduction is that a serious deficiency in the amount of sleep appropriate to their years exists amongst the children attending the English elementary schools, and this deficiency she thinks is aggravated by the fact that the hours given to sleep to elementary school children are often not those best adapted to comply with the time rhythm in the human race.

Miss Ravenhill's tables reveal a remarkable disparity

between the hours of sleep common at each year of elementary school life and those accepted as necessary in the interests of health. In children under six years of age, the average deficiency is three and a half hours per night; in those from seven to nine years of age it is two and a half hours; in those from ten to twelve, when it is at its minimum, two hours; and from twelve to thirteen years of age two and three-quarter hours. It thus appears that among young children there is an average loss each night of more than one-fourth of the amount of sleep deemed necessary at these ages. At each year from seven to twelve inclusive, the loss averages one-fifth of the standard, while at thirteen the deficiency once more amounts to one-fourth of the total number of standard hours. The children in the youngest and oldest age groups lose on an average an amount of sleep equivalent to one night in four, while those at intermediate ages suffer a loss equivalent to one night in every five.

That is, assuredly, a very unsatisfactory state of affairs. It means jerry-brain-building on the large scale with the prospect of early dilapidation and collapse. It means a sort of child stuff out of which it is beyond the power of the most expert and sympathetic of teachers to create Mr. Holmes' juvenile Utopia.

Miss Ravenhill found divergencies between the amount of sleep enjoyed at different ages by boys and girls. Up to seven years of age the average for both sexes is practically the same, ten and a half hours. At eight years of age girls get more sleep than boys, ten and a half against nine and a half hours; and this advantage they

maintain until twelve, when, probably owing to their involvement in household work, they lose it, getting only seven and a half hours against eight and a half for boys—an average deficiency of three and a quarter hours of rest per night, at an epoch when rest is of special importance to them.

Contrary to expectation, Miss Ravenhill's statistics show that children in the country keep almost as late hours as do children in towns, and begin, in some instances, early rising even younger. In one village, for instance, two little boys of five were sent on milk-rounds daily at 5.30 o'clock. At six years of age five boys were employed at 5 a.m. and fifteen boys and girls at 6. These numbers were more than doubled at nine years old, and at twelve two boys got up at 4 a.m. for market, five at 5 a.m., eighteen at 5.30 and twenty-one at 6. Exceptional cases were even worse, a boy of ten rising three times a week at 3 a.m. for market and one of eight and two of nine at 4 a.m. for the same purpose.

Interested by Miss Ravenhill's investigations, I had some inquiries made as to the duration of sleep enjoyed by elementary school children in a Scotch provincial town. Thanks to the kindness of Mr. Waddell, of the Loreburn Street Board School, Dumfries, and his staff of teachers, I have received accurate returns relating to 503 children whose parents are of the artizan working and labouring classes. The returns show general shortage of sleep, not nearly so great as that disclosed by Miss Ravenhill's tables. Children under six in Dumfries show a shortage of one and a half hours against three and a half hours in Miss Ravenhill's returns. Children

of seven to nine show a shortage of half an hour against Miss Ravenhill's two and a half hours; children of ten to twelve three-quarters of an hour against Miss Ravenhill's two hours; and twelve to thirteen, one hour against Miss Ravenhill's two and three-quarter hours.

It is probable that the Dumfries school, which is not situated in the very poorest district of the town, draws its children from a better class than did the schools in the large towns included in Miss Ravenhill's inquiry—the Dumfries children are as a rule fairly well fed—but the difference between Miss Ravenhill's figures and mine is so great throughout as to suggest more care and judgment on the part of Scottish parents in putting their children to bed betimes and in not calling them too soon. It was a Scottish poet who composed the ballad which is said to have been a great favourite of Queen Mary and William of Orange:

“Up in the morning's no for me,
Up in the morning early,
I'd rather gang supperless to my bed,
Than rise in the morning early.”

But, however it arises, there is some interference with sleep in the Dumfries children. They do not get quite enough, although they are much better off than the children to the south of the Tweed to whom Miss Ravenhill's statistics refer. Miss Ravenhill's children are starved of sleep; mine are only pinched a little.

Miss Ravenhill has traced the deficiency of sleep in the elementary school children included in her investigation to premature employment, parental ignorance and neglect, and to bad housing, and that is the crux of the

matter. The sleep shortage of the mass of our elementary school children is a branch of the housing question.

Great numbers of our young children live under conditions which make a sufficiency of brain rest of the right sort impossible. Huddled in insanitary dwellings amidst filth and foul air, in one- or two-roomed houses where talk and drinking and domestic turmoils go on till the small hours of the morning, or in better class habitations in noisy thoroughfares where the shriek of the steam engine "divides the shuddering night" and the rumble of traffic never ceases, with no soft mattress or downy pillow, but on hard boards with ragged accompaniments and verminous distractions, stifled by heat or shivering with cold, multitudes of children get but broken snatches of adulterated sleep with but little brain nourishment in it, and go to school in the morning dull and distraught, the despair of the teacher and a reproach to our civilisation.

During adolescence a proper modicum of sleep is often begrudged under the belief that it conduces to sloth and softness, but a momentous evolution is then going on in the brain and not less than nine hours of sound sleep should be conceded, and not only conceded, but enjoined, for at that age there are many temptations to abridge sleep, and to accept the maxim of the old song that

" . . . the best of all ways
To lengthen your days
Is to steal a few hours from the night, my dear! "

I have affirmed that eight hours sleep in the twenty-four is the proper quantum for adult men and women in

these days, but the up-keep and repair of the brain can in certain circumstances be carried on on much less. Sir Gilbert Blane records that General Pichargu for a whole year while engaged in active operations never allowed himself more than one hour in the twenty-four and was not a whit the worse for his abstinence, and Sir George Elliot during the siege of Gibraltar, which lasted for four years, never took more than four hours sleep in the twenty-four and did not suffer in health; Dr. John Hunter, the great surgeon and anatomist and founder of the Hunterian Museum, never obtained more than four hours sleep at night, but had a nap after dinner. The late Sir William Macewen, of Glasgow, that eminent surgeon and many-sided man, said that very often his labours had been continued throughout the whole twenty-four hours, and sometimes they had gone on for forty-eight hours without resorting to sleep; not that it was necessary so far as the work of his profession was concerned, but on account of the mysteries of Nature which were so enticing that he could not abandon the subject in hand.

The replies to a questionnaire issued by the *Review of Reviews* some years ago to men of light and leading revealed extraordinary disparities in the amount of sleep which they regarded as necessary for their own requirements. Only one claimed nine and a half hours and four from eight to nine, but twenty found eight hours sufficient, while twenty-two got on very well with seven hours, two with five to six, and one, that eminent chemist the late Sir William Ramsay, never allowed himself more than three to four hours. Many

of those, however, who alleged that they went on short commons of nocturnal sleep confessed, like Dr. John Hunter, to afternoon naps. Most literary men at some period of their lives have been stinted of sleep, and it is a remarkable fact that their insomnia does not appear to have affected their cerebral output. Carlyle began to suffer from insomnia at twenty-five years of age and at twenty-eight he wrote that his days were "wrecked by want of sleep and all its infernal *et ceteras*," and ever after that he suffered from it and grumbled about it freely, and yet all his best work was done when his nights were dreary vigils. Rossetti was thirty-two when, after the death of his wife, he fell under the curse of insomnia which made him a slave to chloral for the rest of his days, and yet his finest pictures and poems were produced while he was wholly bereft of natural sleep. Sir Hall Caine, that brilliant and highly-gifted author, writes to me: "My sleeplessness began when I was thirty-five. It was entirely dependent on the strain of my work and on the conditions of its production. An incident of strong emotion in the work I am writing will destroy my appetite, my digestion, my nerves and my sleep in one night. Every such incident in every book I have written is a memorandum of a sleepless night. In the spring of 1893 I never knew what it was to pass an unbroken sleep from one day to another. I awoke nearly every hour of the night and often lay awake for four or five hours at a stretch. The days were all one. Yesterday and to-morrow were the same. I don't think, however, I have ever been more than two consecutive nights sleepless. I have never

taken drugs. A warm bath in the middle of the night will sometimes bring me sleep. The worst misery has always come when a story has had to be written concurrently with its serial production. My book the *Scapegoat* was produced almost week by week as it appeared in the *Illustrated London News*."

Charles Dickens, who, like Sir Hall Caine, was profoundly affected by the good and ill fortune of the creatures of his imagination—I have heard his son say that the family could trace out the plot of any novel he was writing by the merry or woebegone expression of his countenance at table, and that when little Nell died he broke down utterly as if he had lost a daughter—suffered from sleeplessness grievously and always in connection with his literary productions, and sought relief from it in those nocturnal ramblings in London that procured for him so many curious studies of its night side.

In 1890 Professor Tyndall wrote to me: "The malady of my life—I have but one—sleeplessness—seems to grow upon me. I was six and twenty when it first assailed me, brought on by irregularity and carelessness about food. Under the belief that the human soul and will ought to be paramount over the human body, I have honestly fought against it. I incurred dangers, climbed mountains, and plunged, when snow was thickly falling, into Alpine lakes, but the power of combat is not what it was." That was written when Tyndall was seventy, and it was during the years when he was most harassed by sleeplessness that his truly brilliant work was done.

“My natural temperament,” he said, “was ever a joyous one, and this, despite the drawback of the bouts of sleeplessness, has given me years of healthy activity and happy life.”

It would not be difficult to cite scores of literary men who have suffered from insomnia, that special curse of the literary craft, for late hours and intensive cerebral activity are its most frequent causes, and it might be convincingly shown that their lack of sleep, whether fitful or long-drawn-out or concentrated in occasional bouts, has not robbed their wits of brilliancy or their pens of cunning, though it may, in many instances, have shortened their days. It might also be shown that in some cases the best literary work was done during periods of sleeplessness, when the brain, as it were, got into full swing, which it never apparently did when its movements were interrupted by breaks of somnolence.

Now it is impossible to doubt that nutrition and repair must have gone on in the brains of sleepless but highly productive literary men during their spells of sleeplessness. Every thought, feeling, volition involves some waste of brain-tissue, and thinking hard during a month or six weeks of entire sleeplessness they must at the end of the ordeal have had no brains left had the nutrition and repair of the brain been confined to the sleeping condition. Their brains must have learnt the trick of the heart and gone to sleep in snatches as the heart does between its beats, or they must somehow have acquired the art of going to sleep in sections. The brain is made up of a number of centres and groups of centres, which are capable of *quasi*-independent

action. It is probable that some of these centres are always in a state comparable to the diastole of the heart, or at rest more or less, and that cerebral activity flushes from point to point.

But, however the labours of active brain workers are carried on during periods of insomnia, it is, I think, desirable to emphasise the fact that the insomnia, although always to be combated by all available means and under medical guidance, is not invariably attended by such terrible consequences as is generally believed. It is assuredly a distressing and abnormal condition and one which should be corrected as soon as possible, but the disastrous consequences which follow it are in many cases to be attributed, not so much to the insomnia itself, as to the intense anxiety with which it is regarded, as a harbinger of softening of the brain and to the remedies which are resorted to for its relief.

Among ordinary men not engaged in literary pursuits a deficiency of brain rest is in these days a source of discomfort and solicitude. It is indeed one of the plagues of our period, a plague that is becoming more and more prevalent in this neurotic age, and that is due to the immoderate use, that is to say, abuse of the brain in various ways. But to those who suffer from this plague it must be some consolation to know that it is not always as formidable in its consequences as has been supposed. Loss of sleep in infants, children and young persons when brain growth is still going on is significant of evil and well calculated to create alarm, but in those who have reached adult life, when brain growth is practically over and only the functional equilibrium

of the brain has to be maintained, it is by no means as prognostic of danger as is often alleged. Sufferers from insomnia should also remember, what is sometimes overlooked, that short of actual sleep there are curious sub-somnolent states that, although thought of little account, are very restful to the brain. It has happened to many people to lie awake all night, hearing the clock strike every hour, never closing an eye, as the phrase is, and yet to have arisen in the morning reinvigorated to some extent, and ready for work, in a very different condition from what they would have been in had they sat up all night reading or watching. The day succeeding a quiet, albeit sleepless, night in bed is characterised by sensations very different from those experienced in the day following a sustained vigil. There are in a sleepless night what are called dozes which are of quite incalculable length and are often much longer than they are believed to be. Even a midday siesta without sleep but with a sense of drowsiness is not without its restorative influence to jaded brains as well as to jaded muscles.

There may be an excess of brain rest in adults as well as a deficiency, and that may eventuate in mental hebetude. We all remember the melancholy instance of the fat boy, and there are amongst us some who oversleep themselves and so, perhaps, induce increased sluggishness of a naturally torpid intellect.

Happy the man who has ascertained the exact dose of sleep that is suitable to his individual requirements and who partakes of that dose with regularity, with those occasional variations which enhance enjoyment in the accustomed programme. Happy, too, the man who can

command sleep when he feels the need of it! The fact that John Wesley, who led a life of such strenuous activity, should have retained his mental integrity to eighty-seven, has been attributed to his power of going to sleep whenever he wanted to do so. The Duke of Wellington shared with Wesley this power of willing sleep. When asked if he often lay awake he replied, "I don't like lying awake; it does no good. I make a point of not lying awake."

I have been speaking of the duration of brain rest, and of the pernicious effects of any reduction in its proper quantum. But the quality as well as the quantity of brain rest has also to be considered. Sleep varies in quality in different individuals, at different seasons, at different stages of its continuance. We speak of it as sound, deep, refreshing, or as light, shallow, broken or disturbed; and its intensity or the degree of unconsciousness and imperturbability that accompanies it has been subjected to scientific measurement. A device for ascertaining the amount of sensory stimulus necessary to interrupt it has been employed. The appeal is made to the ear. A lead ball, for instance, is dropped from varying heights on to a lead plate, and the height from which it has to be dropped in order to cause noise enough to awaken the sleeper is noted. The result of experiments by this and other methods is that the maximum intensity of sleep is reached between the first and second hours, followed by a rapid fall in intensity until the fifth hour in adults and the seventh in children of four years of age, and by a subsidiary and comparatively slight rise in intensity from the fifth to the sixth

hour in adults, and from the seventh to the tenth in children. From the sixth hour in adults and the tenth in children there is a decline in the intensity of sleep, as measured by the auditory stimulus necessary to break it, until the hour of waking is reached.

It is but reasonable to suppose that the recuperative power of sleep is proportionate to its intensity, and it appears therefore that experiment confirms that popular belief that the "first sweet sleep of night," or the "beauty sleep," as it is popularly called, is the best, and that one hour's sleep before midnight is more restorative than two hours after it. It is probable that the curve of intensity of sleep varies somewhat with the individual and with surrounding circumstances, but it may be laid down as a general rule that it is in the first part of a night's sleep that the products of fatigue are most rapidly removed from the brain and that repairs are most promptly executed, and in the case of children the ground cleared for growth. It follows that it is that part of the night's sleep that should be most jealously guarded and kept tranquil and free from sensory disturbances, and that it is peculiarly important that it should be secured unbroken to children.

Unhappily, however, in these days it is just that first and most precious segment of sleep that is most liable to be broken in upon and damaged, and amongst our poorer people it is only through improved housing that we can protect and better it. For other classes, something may be done by the education of parents in a knowledge of the requirements of child-life. They should have impressed on them the special value of this

first sleep and their obligation to encourage it and make it peaceful, and they and teachers and all concerned should be reminded that it may be promoted by a state of bodily and mental composure preceding its advent. For all children, and for grown people too, there should be a period of settlement before sleep. Mental and bodily activities should be allowed to subside gradually, and there should be no forced work for a couple of hours before bed-time. Home lessons for young children, therefore, and what is called repetition for boys at school, stand condemned, and adults should as far as practicable put aside business worries in evening hours and turn to pleasant familial or social intercourse or to some light recreation, music, the drama, the pictures, a vacuous novel, a game of patience or a soothing cigar.

Innumerable artifices and stratagems to secure brain rest by means of mental operations have been devised by the victims of insomnia in all ages and countries, and these when critically examined resolve themselves into distractions of the mind from the beaten highway of thought and the monotonous pursuit of some almost mechanical mental process. The harassed merchant is recommended to recite poetry, the overstrung artist to plunge into logic, and all and sundry to count backwards, to repeat the multiplication table, to follow the ticking of the clock, to think of humming bees, to fancy the bed whirls round, and so on and so on. A natural philosopher not long ago made public his specific for brain rest, which consists in making the fingers of his right hand

describe a circle while he is thinking of the books in his library one by one. This device, which he considers infallible, he calls, "marrying the mind to the body." But the difficulty in inducing sleep is to divorce the mind from the body or to secure their temporary separation, and the philosopher's method is no better and no worse than scores of others that have been suggested. External impressions of a monotonous character act much like wearying mental repetitions, and so mesmeric passes and rubbings may encourage brain rest, being most potent in doing so when aided by unquestioning faith in their efficacy. The sound of running or dropping water has a peculiarly soothing influence on the nerve-centres, and it is curious that this sound, which in certain diseased states, for instance hydrophobia, is maddening, becomes in other states exquisitely pleasing and tranquillising. I came on the case of a lady who, when dying, begged to have the contents of the ewer poured into the basin by her bedside, that she might satisfy a craving to hear the splash of falling water once again.

But although silence and lulling murmurs are most commonly conducive to brain rest, there are cases in which noise and turmoil seem to invite it. A literary man worn out with prolonged insomnia which drugs had failed to cure wrote to me: "I must go to seek the tempest. London is not windy enough for me. I was born and brought up on a Scottish mountain-side and in the still air of the metropolis I lie awake straining my ears to hear the voices of the air." He went off late in the autumn to a storm-vexed corner of the Hebrides

and wrote to me soon after: "It blows big guns here and I sleep like a top, my only trouble being a recurring dream that I have overslept myself and am late for the parish school."

Modern chemical and medical science has put us in possession of a number of new hypnotics of great and varying potency, some of which, it may be surmised, act by relaxing the dendritic processes in the brain so that the passage of sensory and motor impulses is inhibited. These hypnotics have proved an inestimable boon to sufferers from sleeplessness, but should, of course, never be used except under medical advice and control. Some of them may secure brain rest for prolonged periods without any injurious consequences and without inducing what is called the drug habit.

"Blessings," said Sancho Panza, "on the man who invented sleep"; maledictions, we might add, on those who tamper with this "chief nourisher in life's feast." A dislocation of the rhythmic succession of activity and repose in the brain is hazardous to health. Slow and insidious its effects may be, but they are far-reaching and maleficent. No more beneficent, salutary reform can be undertaken in these days than one that will secure to the rising generation a sufficiency of genuine brain rest.

"O! sleep it is a gentle thing,
Beloved from Pole to Pole,
To Mary Queen the praise be given,
She sent the gentle sleep from Heaven
That slid into my soul."

THOMAS CARLYLE'S STUDENT DAYS

A DARK, frosty November morning in 1809, and a wiry little fellow not yet fourteen, shrinking and sensitive but with hot blood too, clad in hodden-grey, trotted along the village of Ecclefechan accompanied to its verge by his father and mother, and then, under the guardianship of a boy two years his senior, began a journey on foot of a hundred miles and of five days' duration to that seat of learning where with aching heart (for was he not leaving his mother?) and with boundless hope (for what might not his new mother do for him?) he was to enter on a course of study, "attend the classes" and gain knowledge of all kinds.

A bright spring afternoon in April 1866 and an old man of seventy-two, bowed, rugged and worn, but glowing still with spiritual ardour in a silken academical robe heavy with bullion, surrounded by officials and dignitaries in crimson and ermine, mounted the platform of the music hall in Edinburgh, packed from floor to ceiling, and reverberating with plaudits of enthusiastic welcome, to thank young Scotland for the highest honour it could bestow upon him, to sum up with touching solemnity the lessons learnt in a studious life, and to bid those entering on their studies then, "Work and despair not."

It was "a perfect triumph," as Tyndall said; the

poor stonemason's son, friendless and forlorn but rich in dauntless resolution, had by sheer brain-energy raised himself from what seemed hopeless obscurity, and in spite of countless obstructions, to the pinnacle of fame. He was Lord Rector of the greatest University of his native land, surrounded in homage by the most illustrious men of his time, full of wisdom and learning, delivering a message that was received with world-wide acclamation.

It was a toss up whether Carlyle went to the University at all. There was a large family to be provided for, and means were scant. The wise men of Ecclefechan advised that it would be a risk and a waste of money to educate him above his station, but his father had discernment and courage. The schoolmaster's reports were favourable; he saw something uncommon in the boy, and was particularly struck by his handling of sums—a matter of which he could judge—and so he resolved to make the venture. Small Tom was sent to Edinburgh as a step to that parish pulpit in which, it was hoped, he would one day wag his head, but with no dream of that universal and apocalyptic pulpit from which he was destined to address as large a congregation as ever modern preacher has spoken to. Had it been otherwise, had the boy been set to delve the clods of Annandale, or apprenticed to some humble trade, he would still have been Thomas Carlyle. Genius like his no barrier can restrain. By some other route he must have come to the front, but the other route might have been more tedious and laborious, and beset with perils, so we must be thankful that in the company of Tom Smail he made that wintry pilgrimage by Moffat and Airock Stane,

settled down in the mean lodging in Simon Square, and matriculated as a student in the University of Edinburgh.

There is no part of Carlyle's life of which we know less than his undergraduate career in Edinburgh, extending from 1809 to 1814—his thirteenth to his eighteenth year. He tells us that while he was at college his father wrote to him "duly and affectionately," and there can be no doubt that he "duly and affectionately" replied, but none of his correspondence with his family earlier than the year 1814 has been preserved. There are, I believe, in existence a number of letters from several of his eleven chosen friends at the University—eleven out of eleven hundred students, and it is curious how teams of all kinds run into elevens—and these will, it is to be hoped, be published some day; but they are not accessible to me, and if they were, the limits prescribed to me would prevent me from quoting them; and even if I could quote them, they would not probably throw much light on Carlyle's student days, for the letters of these friends of his, clever lads, distinctly superior to ordinary youths of their age, peasants' sons like himself, with their way to make in the world, were not, if we may judge from the specimens that have been given, so much biographical and anecdotal as critical and didactic. They discuss Scott's last novel, Byron's poems, the fall of Napoleon, mathematical problems and sermons, but afford no insight into University doings or college customs; they do not even contain any poking of fun at professors. They show, however, unmistakably, that the life led by Carlyle and his college friends was pure,

simple and high-minded, free from any of that ribald taint that sometimes infects adolescent intercourse; they prove, too, that even then Carlyle was a leader amongst men. His friends looked to him to direct their judgment, to advise them in their difficulties and even to help them, when need was, out of his small savings, and they one and all recognised that he was superior to other young men of his age in character and intellect, and was destined to greatness of one kind or another. Had he been a member of any University literary or debating society, which he was not, he would undoubtedly have been president and dictator.

One of Carlyle's student-friend correspondents, named Hill, who addressed him as "Dear Doctor" or "Dean" and subscribed himself "Peter Pindar," supplied in his letters, which have been published, some faint forecasts of later Carlyle traits. He chaffs him for being peevish and splenetic, praises his effective power of speech and compliments him on his mirth and wit, but thinks him too sarcastic for so young a man. And Hill further makes it clear that Carlyle escaped one of the exantheams of undergraduate days, and never had a love affair nor even a flirtation while in Edinburgh. "Fall in love," says Hill, writing in 1814, "fall in love as soon as you can. Fall in love, you will be the better for it." But not until he was twenty-two years old and schoolmaster at Kirkcaldy did the first graceful delicate shoot of the tender passion spring up in his heart, when the celestial orbit of Blumine or Margaret Gordon intersected his sublunary one—a shoot that was soon to be chilled and to droop and wither away.

And outside his correspondence there is little to be learnt from Carlyle's writings of his undergraduate experiences. In his *Reminiscences* he makes few references to his four or five years of pupilage in Edinburgh; and indeed, it cannot be denied that he did not look back to that epoch of his life with very pleasurable or grateful feelings. He was not, he thought, fortunate in his seminaries. Of the Annan Academy he had painful and resentful recollections, and his denunciation of it is scathing. "One way and another," he says, "I was never so wretched as here in that school, and the first two years of my time in it still count amongst the miserable of my life. . . . Unspeakable is the damage and defilement I got out of these coarse, misguided, tyrannous cubs. . . . Academia! High School Instructors of Youth! Oh ye Unspeakable!"

Against his University Carlyle was not thus embittered, but he does speak of it somewhat disparagingly, and nowhere does he turn to it with the love and reverence which students of my time never fail to manifest towards it and which students of a later date still more joyfully express. Only in the evening of his days, when the distance grew mellow and golden in the twilight, did he refer to it as "my dear old Alma Mater." The fact is that in his time the University was a somewhat cold, almost a negligent mother. She has softened her mood and warmed her heart since then, and learnt to bestow all due maternal attention on her progeny; by the old standard she might even be said to coddle them. Carlyle's approach to her lap was, as I have said, a weary pilgrimage for a small boy,

and when he arrived there, footsore and expectant, he found little to cheer or encourage him. St. Giles' High Kirk, the Lucken-Booths—where old women in miniature shops sold combs, shoe-laces and trifles—and the Parliament House as seen in the evening lit with candles and in strange chiaroscuro, with its crowd of human creatures, some in wigs and black gowns, and its boundless buzz of talk, impressed him vividly on his arrival in Edinburgh and dwelt in his memory, but he has not much to say about the University. "I learned little there," is his verdict. There does not appear to have been much individualisation of the students at that time, for Professor Christison in the Latin Class never noticed him, nor could distinguish him from another, Mr. Irving Carlyle, an older, bigger boy, with red hair, wild buck teeth, and scorched complexion and the worst Latinist of his acquaintance.

In Philosophy it was not much better. Dugald Stewart had given place to Brown, whom Carlyle found unprofitable, "bewildering and dispiriting as the autumn winds amongst withered leaves," but in mathematics he got surer foothold and made progress. Professor Leslie discovered his taste and his talent, and exerted himself to help him with a zeal of which he ever afterwards spoke with gratitude. "Leslie alone," he says, "of my Professors"—a grievous indictment against the faculty—"had some genius in his business, and awoke a certain enthusiasm in me. For several years geometry shone before me as the noblest of all sciences, and I prosecuted it in all my best hours and moods."

Sartor Resartus is only intermittently biographical, but

it is not difficult now, in view of the evidence available, to pick out the bits that depict Carlyle's own career, and the references to Teufelsdröckh's University are unquestionably applicable to Edinburgh. "Had you anywhere in Crim Tartary," he writes, "walled in a square enclosure, furnished it with a small ill-chosen library, and then turned loose into it eleven hundred Christian striplings, to tumble about as they listed from three to seven years, certain persons, under the title of Professors, being stationed at the gates to declare aloud that it was a University, and exact considerable admission fees—you had not indeed in mechanical structure, yet in spirit and result, some imperfect resemblance of our high seminary. . . . We boasted ourselves a rational University in the highest degree, hostile to mysticism; thus was the young mind furnished with much talk about progress of the species, dark ages, prejudice, and the like, so that all were quickly enough blown out into a state of windy argumentativeness, whereby the better sort had soon to end in sick impotent scepticism; the worst sort explode in finished self-conceit, and to all spiritual intents become dead. . . . The hungry young looked up to their spiritual nurses, and for food were bidden eat the east wind. What vain jargon of controversial metaphysic, etymology, and mechanical manipulation, falsely named science, was current there I indeed learned better than most. Among eleven hundred Christian youths there will not be wanting some eleven eager to learn. By collision with such a certain warmth, a certain polish was communicated; by instinct and happy accident I took less

to rioting than to thinking and reading, which latter also I was free to do. Nay, from the chaos of the library I succeeded in fishing up more books than had been known to keepers thereof."

It is perhaps the average children and the weaklings who profit most by the mother's care, and who are afterwards most conscious of what they have owed to it; the strong are more independent of it and appreciate it less. And as in the family so is it in the University. The below-par and level-minded men are most alive to the educational advantages it offers, and derive from them most benefit, while the vigorous intellects tend to undervalue them, and forge ahead, as they think, in their own prowess. But even the vigorous intellects are often more indebted than they imagine to the aids and methods they decry, and whatever the drawbacks and deprivations of his time may have been, the University of Edinburgh was of incalculable service to Carlyle, and had a large share in the making of him. It gave an opportunity and a basis for that self-culture which is the vital element in all education. It gave him breathing space and atmosphere, and quickened and deepened his mental respiration at an age when, without these, crippling contractures are apt to set in; it imparted stimulus to his powers. If the teaching was weak the discipline was splendid. The life was bracingly frugal and thrifty. He had sent from home oatmeal, potatoes, salt butter, and eggs, and in the return cart his linen went home to be washed and mended. Think of that, ye gilded youths of the Union!

Neither the University chest nor the students' pockets afforded funds for tutorial instruction in these days. The professors harangued large classes and scattered seed sound and unsound, some of which fell on stony places, but much of which took root in good ground and bore fruit in due season, but they had no leisure to devote to the advancement of promising pupils. As regards science, it was words, words, words; laboratories, specimens, apparatus and demonstrations were unknown. But a fine sense of self-dependence was engendered, heat and light were generated by the contact of mind with mind, a certain ground plan of life and human nature was somehow fashioned. It was while an undergraduate at Edinburgh that Carlyle learnt to read fluently several languages, and obtained some grasp of science such as it was. The foundation of his literary life was there, he has admitted, laid.

Carlyle's undergraduate career was prematurely cut short. He went through the whole Arts course, occupying four years, but did not take the Arts degree because no one then did so. It was not regarded as of either pecuniary or honorific value. It was substantial acquirement that was sought after, not a string of alphabetical tags, always more or less equivocal. He quitted the University in 1814 and went to teach in Annan Academy, still with some potential outlook on Divinity, intending as a rural Divinity student to visit Edinburgh for a few days each year, and deliver certain discourses. Six years of that would have brought him into the ministry, or four years of continuous attendance at Divinity Hall in Edinburgh. But his enthusiasm for that line of

life had long died out, if indeed it had ever lived; prohibitive doubts had invaded his mind, and although he detested his situation at Annan, all thoughts of seeking refuge from it in the Church were abandoned. He did not after 1814 return to Edinburgh as an undergraduate.

In connection with Carlyle's undergraduate career there is not one allusion to any sport, pastime or recreation beyond his meetings with his friends and a pipe of tobacco. Beyond snowball bickerings, there were apparently no games or pastimes in the University. Puritanical notions still prevailed as to the sinfulness of frivolous amusements, and the boys were desperately in earnest to make a living. It was a grievous deficiency, and I rather think Carlyle, although he does not mention it, had a more serious grudge against the University for its neglect of his physical than of his mental training. Then began that dyspepsia which pestered him for the rest of his life. He ultimately took to horse exercise when it was too late, but he never felt an interest in any mere game. The thing wanting to him was golf. A couple of rounds a day would have saved him much misery, and the spoon, the niblick, and the cleek would have afforded vent for all the minor irritabilities.

And what about the holidays, the long, long vacation in these days; seven months in duration, extending from April till November? The poor students, and most of the students to the north of the Tweed were poor then, had to contribute to the cost of their college expenses, by work of some kind in these intervals. They taught pupils or worked on the farm at home.

Carlyle was not amongst the very poorest. His father's income had once reached £100. And we have no indication that he engaged in any kind of remunerative work during the recess. The probability is that he devoted himself entirely and diligently to his books, and piled up fruitful knowledge in the ample granaries of his brain. But under what adverse circumstances did he do this? And what inflexible will power must have been exercised to carry on study profitably amidst the incessant distractions around him. Not for him, the secluded studio, the well-shelved silent library, even the quiet closet. No doubt his good mother did her best, but the house at Ecclefechan contained only three rooms, and so did that at Mainhill, and there were seven other children at home when Carlyle spent his holidays there. His studying or sitting-room must have closely resembled that of Jean Paul Richter which he describes, and, by the way, Carlyle seems to have been more influenced by Jean Paul in style and habit of thought than by any other author, and the histories of the two present many singular similarities. "Jean Paul's room," Carlyle says, "was a true and beautiful emblem of his simple way of thought, which comprehended at once the high and the low. Whilst his mother pursued her household work, occupying herself about stove and dresser, Jean Paul was sitting in a corner of the same room, at a simple writing desk, with few or no books, but merely with one or two drawers containing excerpts and manuscripts. The jingle of the household operations seemed not at all to disturb him any more than the cooings of the pigeons

which fluttered to and fro in the chamber.” But Jean Paul’s situation was tranquillity itself compared with that of Carlyle at Ecclefechan and Mainhill with the children plus the domestic turmoil and the pigeons; and remembering what he must have suffered in these days, while struggling with mathematics, dabbling in philosophy and holding high converse with Homer, Æschylus and Horace, in a domestic hubbub and imbroglio of noises, we can understand the craving for solitude which ever afterwards possessed him (“If I had wings I would fly to Italy, fly to Saturn, somewhere where I could be alone”) and the intolerance of noise he displayed, which through various stages of intensification led to the war against cocks and hens, and ultimately to the sound-proof room under the roof at Cheyne Row, into which he was, he affirmed, “whirled aloft by angry elements.”

Last of all in the hours of retrospect and bereavement, tender memories of his undergraduate days and affectionate feelings for his Alma Mater must have dominated Carlyle, for in 1867, the year after his wife’s death, he bequeathed to the University of Edinburgh her estate of Craigenputtock. He did this in memory of his dear, magnanimous, much-loving and inestimable wife, and to show his interest in the advancement of education in his native Scotland, and provided for ten bursaries—five for proficiency in mathematics, and five for proficiency in classical learning. So ten undergraduates to-day have cause to think thankfully of the undergraduate from Ecclefechan of 1809.

BRAIN-BUILDING

“ Build me straight, O worthy Master !
Staunch and strong, a goodly vessel,
That will laugh at all disaster
And with wave and whirlwind wrestle ! ”

THAT is practically the order given by every conscientious and prudent parent when he sends his boy to school. The vessel is the brain, and the schoolmaster is entrusted with the building of it, but the fact is that it is already built before the schoolmaster's aid is invoked.

I remember asking that gifted man, the late Dr. Gunyon Rutherford, when he was Headmaster of Westminster School, whether I should be correct in saying that, regarding education as a preparation for life, fifty per cent. of it was done before a boy entered a public school? His reply was, “ Put it at seventy-five per cent. and you will be nearer the mark. What we do in public schools is to impart a certain polish, but the form and function of the particular article of furniture and the grain of the wood have been fixed and determined long before it comes into our hands.”

It would take volumes to describe the educational building of the brain and to discuss the merits of the many different styles of cerebral architecture and methods of cerebral construction that have been recommended as best adapted to fit it for its perilous voyage.

There are brains of all sorts and sizes, and of vastly different tonnage, but whatever their dimensions, carrying capacity or destination may be, they are all built of the same material. They are made up of brain substance, grey and white, and it is about that that I wish to say a few words.

The most wonderful stuff in the world is this brain substance—the apotheosis of protoplasm. If we could read it aright and, holding it in our hand, understand what it is in its essence, we should have revealed to us more fully than by any “flower in the crannied wall” what “God and man is.”

The brain substance proper or grey mantle, composed of many millions of cells—one thousand six hundred millions is the lowest estimate—little pyramids of nucleated protoplasm sending out branches in all directions, and enclosing the white substance made up of conducting cables, differs demonstrably in structure in different animals and in different regions of the same brain. As regards its contour and the form number, arrangement and connections of the elements of which it is built up, it is not alike in any two human brains, never was and never will be, for it is the arcanum of individuality.

But as regards its chemical constitution brain substance is everywhere very much the same. It is impossible to distinguish in a test-tube a bit of the brain of an idiot from that of a philosopher. And yet we are justified in believing that there are chemical differences if we could only detect them.

In certain diseased conditions, chemical changes

have been recognised in the nerve-tissues and in the fluid that lubricates the great cerebro-spinal shaft and dome, and it is probable therefore that subtle differences and substitutions in its organic compounds correspond with differences in temperament and habits of action. It is upon the integrity and vigour of this brain substance that all mental manifestations depend, and therefore the due supply of suitable nutriment to it is of paramount importance in connection with all human affairs. The brain must be properly dieted if it is to do its work, and the question of the feeding of the brain is therefore one in which all are interested.

Now the brain, like all organs in the body, feeds itself. The blood current when normal presents it with an ample choice of viands, and from these, with nice discrimination, it selects what are needed for its requirements for the time being. But the blood is not always normal, it may be impoverished and the brain is starved, it may be too generously enriched and the brain is surfeited, it may, from the failure of some gland or viscus, be lacking in some subtle constituent and the brain is deteriorated, it may carry pernicious ingredients and the brain is poisoned.

In the earliest stages of life the one all-sufficient brain-food is milk—the mother's milk, which is specially adapted to the cerebral substance of her offspring. The milk of different women varies considerably in quality—that of brunettes is richer than that of blondes—and we may assume that the milk of each particular mother is best suited to the brain building of her particular child. There are evasive elements in foods

of which we as yet know little, and it is highly desirable that when its construction and elaboration are going on most rapidly, the brain should be supplied with the inimitable material that Nature has provided for it. Wet nurses have their drawbacks—Zola has vividly depicted these—and when the maternal flow of milk is insufficient or when it naturally ceases, the milk of the cow duly modified best serves the brain. Especially needful is a milk regimen during the period when what is called myelinisation is going on ; that is to say, when the nerve-fibres of the different zones of the brain are being clothed in sheaths, which mark their structural completion and the time of their entrance upon full functional activity. All through childhood, and indeed throughout youth and until the coping stone is placed on the brain, milk is like mortar knitting its components together.

Apart from milk, there is, strictly speaking, no special brain food, but there are certain constituents of food that are essential to brain nourishment, and among these is one that has been exalted into a position of primary significance, and that is phosphorus. “Ohne Phosphor kein Gedanke,” said Buchner—without phosphorus, no thought—a wild generalisation, founded merely on the fact that a phosphorised fat enters into the composition of the brain. We might as truly say, “Without sulphur or without iron, no thought.”

Ever since its discovery in 1669 phosphorus, “the light bearer,” has been credited, more on analogical than on scientific grounds, with some integral part in mental operations, and modern research has so far

confirmed this by showing that it is requisite to the growth and completeness of the brain.

Wherever growth is most active phosphorus is most abundant, and the brain and the bones more particularly demand supplies of it while they are developing.

A due admixture of it in the food of children and adolescents is therefore of vital obligation, and while we cannot specify any particular diseased condition that is induced by a deficiency of phosphorus in food, we are warranted in concluding that, as a deficiency of lime causes softness of the bones and a deficiency of iron anæmia, a deficiency of phosphorus may make the brain slow and slack in evolution.

But although phosphorus is essential to brain growth and vigour, quite enough of it for these purposes is to be found in an ordinary mixed diet, and there is no call for the use of phosphates in their inorganic form. It would seem, indeed, that phosphorus in its inorganic shape is much less useful than in its organic combination; and it should therefore be furnished to the system as contained in food rather than in manufactured salts which are phosphates of the alkalies and earths.

Foods, however, differ greatly in the amount of phosphorus they contain, and regard should be had to their phosphorus endowment in choosing and recommending foods for the young.

If the vegetarians had their way in the feeding of the young, indigence of the brain would probably result. A child reared on carrots and turnips, which contain, respectively, 0·036 and 0·058 per cent. of phosphoric acid, would probably grow up sheepish, if it grew up

at all, and make a poor show as compared with a child fed on eggs and mutton, which yield 0·337 and 0·425 per cent. of phosphoric acid.

Of all ordinary foods, cheese is richest in phosphorus. It contains as much phosphoric acid as 1·35 per cent., while green vegetables contain only 0·18 per cent. As cheese, besides being well-stored with phosphorus, is really one of the most concentrated forms of nourishment with which we are acquainted and contains in the most suitable proportions the best nerve- and muscle-building materials—a pound of Cheddar cheese represents the total casein and most of the fat of a gallon of milk—it is a highly commendable food for the young. The drawback is that the large amount of fat it contains renders it indigestible by delicate stomachs, and young stomachs are delicate as compared with adult ones. For all stomachs, the digestibility of cheese is greatly increased if it is reduced to a fine state of subdivision as by grating.

Apart from mere idiosyncrasy, which is sometimes responsible for a repugnance to cheese, a distaste for it often arises from its having been eaten too freely after a full meal, or when unripe or tough or dry, or to its not having been combined with farinaceous stuffs of some kind, as it should always be. Properly employed and of proper quality, it is a form of food that is appetising, that is singularly active in stimulating the secretion of the salivary glands—that is wholesome, nutritious and cheap—excellent as a substitute for meat or to supplement a diet insufficient in meat. It may be hoped that having regard to these qualities,

to its flesh- and brain-forming principles, and its freedom from toxins which conduce to gout, cheese will yet enter more largely than it has hitherto done into the dietary of children and adolescents in the brain-sprouting period. Special preparations of it which make savoury combination with farinaceous and vegetable foods and in broths and soups and afford an ample supply of proteins and phosphorus would prove a boon to the rising generation.

The recognition of the need of phosphorus as a brain food and the belief that fish contains much of it has led to the extensive use of fish by brain-workers. But the belief is a fallacy founded, it appears, on a random statement by Dumas the chemist that those who seek phosphorus in fish will not be disappointed. It is nevertheless an excellent food for brain-workers who are leading a sedentary life—as so many brain-workers do—for the lean kinds of it, at any rate, with a smaller proportion of proteids and extractives, are less stimulating than meat. For young people with excitable and unstable nervous systems or with neurotic tendencies fish may with advantage to a considerable extent take the place of meat.

It was the quest for phosphorus, and a crude notion of like nourishing like, that originally led to the adoption of the brains of animals as a special brain food for man, but recently it has been suggested that they might be beneficial otherwise than through the phosphorus in the lecithins. The wonderful effects that have followed the administration of extracts from certain glands of the animal body, or of these glands themselves, have

created the hope that the growth and working of the brain might be furthered by feeding on animal brain substance or extracts which would supply to the lymph and blood in an easily assimilable form the active principles which are essential to brain nutrition and formation. It is now a matter of common knowledge that a transformation that may be called astounding has been wrought in cretinous idiots and in the victims of myxœdema, a grim disease, by preparations of the thyroid gland of the sheep. Dwarfish, feeble-minded, toad-like, hide-bound beings—mere caricatures of human nature—have been made to add a cubit to their stature, to display intelligence and assume comely lineaments by the supply to them of material of which they had been deprived by defect of their own thyroid glands. The triumphant results thus secured have instigated experiments with other healthy animal glands and extracts with the hope of rectifying many varieties of impaired nutrition and degeneration. Among these has been cerebrin—a substance obtained from the brain of the sheep, which it was anticipated might have a sedative effect, in certain disordered states of the brain, such as St. Vitus dance or hysteria, or even compensate some cerebral defect. But cerebrin has not answered to these expectations. The trials given to it have not proved satisfactory. It is not without some slight physiological action, but in mental disease it has proved useless, and no indication has been given that brain feeding in any guise will influence brain growth or beneficially affect brain function. The brains of animals may therefore continue, as they have hitherto done, to

form a not very popular element in diet—a readily digestible but not very nourishing food, but no expectation may be entertained that they will do more than this or contribute to what, in slang phraseology, is known as “braininess.”

There is no special brain food. At all stages of life a rational dietary, based on physiological common-sense, which holds the balance between parsimony and prodigality, will furnish the brain with all it wants to make the best of its resources. No attempt should be made to force on the brain any kind of nutriment that is supposed to be its own peculiar provender. Its appetite will guide it aright in its marketing. It must have at all times, however, within its reach a proper quantum of protein—that omnipotent tissue-former which seems to have a stimulating action on the brain; all energetic races consume it freely, and it is best derived from animal food, its most compact and convenient source.

There is one epoch of growth when the proper feeding of the brain is of great moment, and that is during the transition from childhood to adolescence. With the metamorphosis that then takes place there is a change in the appetite for food. While the wisdom teeth are erupting tastes are altered. In boys the love of sweets and fruits becomes less clamant and is replaced by an increased relish for animal food and savouries. In girls, on the other hand, the craving for sweets is intensified, as in them the reconstruction of taste that is going on is sometimes betrayed by squeamishness about certain kinds of food and even sometimes by morbid addictions as to chalk and dry rice.

At this transition period and throughout adolescence there is a peculiar tendency to malnutrition and anæmia, and very liberal rations—more liberal, indeed, than those required by the adult—are called for. If these be withheld, tuberculosis is invited and nervous exhaustion and unrest are not unlikely to arise—and these again may create a longing for stimulants. It is at this period that the seeds of subsequent inebriety are not unfrequently sown. A generous diet should be insisted on and foolish experiments in abstinence—whether from religious or athletic or thinning motives or from pure faddism—should be discouraged.

There is one kind of food that is helpful to the brain and to the whole body throughout childhood and adolescence, and that is oatmeal. Oats are the most nutritious of the cereals, being richer than any other in fats, organic phosphorus and lecithins.

Wheat bread is, and will probably always remain, the staple nutritive substance of civilised man and is pre-eminent for assimilable protein; maize is highly sustaining and is richest in fat, rice is richest in starchy matter, barley in mineral matter, but oats have good qualities that are all their own. They were once spoken of disrespectfully by Dr. Johnson as a food fit only for horses and Scotchmen. And what men! and what horses! is the answer. A recent French writer says that bread made from oats is coarse and consumed only in very poor countries, which shows that he is unacquainted with the present vogue of oatmeal in England.

But while oatmeal has been gaining ground among

the well-to-do classes in Great Britain it has unhappily been losing its hold on the labouring masses. At one time it was the mainstay of the Scottish peasants' diet and produced a big-boned, well-developed and mentally energetic race, but it is so no longer, having largely given place to less useful and economical foods, and in the case of the children in the large towns, at any rate, to tea and bread with dripping, margarine or jam. Oatmeal in the form of porridge with milk is unrivalled as a breakfast food for children and young men and women.

Some recent scientific observations have thrown new light on the physiological effects of oatmeal. It has been shown that in rats fed for eight weeks on oatmeal and water the thyroid gland was double the size of the same gland in rats that had been fed for the same time on bread and milk. Now the secretion of this gland is intimately related with metabolic processes throughout the organisms—atrophy or destruction of the gland being productive of cretinism or myxœdema. It seems probable that the bulk and brawniness of the Northerners—attested by the Anthropological Survey—have been in some measure due to stimulation of the thyroid gland by porridge in childhood. Oatmeal is apparently, through its action on the thyroid, as well as directly conducive to the building of the brain. Cod-liver oil is under certain circumstances an invaluable auxiliary brain-food, and certain drugs give a fillip to cerebral nutrition when it is flagging, but these can only be employed under immediate and continuous medical supervision.

CLARET IN SCOTLAND

DEAN RAMSEY tells of a minister of the Established Church of Scotland who had a mortal antipathy to the whole French nation, which he frequently abused in no measured terms, but who, at the same time, had a great relish for a glass of claret, which he considered the prince of all social drinks, and so he invariably finished his anti-Gallican tirades with the reservation, "But it maun' be admitted that the bodies brew a braw drink." Well, for several centuries the minister's countrymen in Scotland of all classes shared his opinion that claret is "a braw drink," and partook of it as an habitual beverage.

Claret probably made its way into Scotland at an early date. Ever since the fourth century, when Ausonius, a native of Bordeaux, tells us that wines of that name were in demand in Rome, they have been shipped to many parts of the world. To England the Normans brought them along with their feudalism, and the taste for them must have spread rapidly from the Court and higher circles to the masses of the people, for in the middle of the twelfth century, when Guienne was still a province of England, the Anglo-French wine trade had attained to a considerable development. Large quantities of red wine were imported from that part of France in the reign of John, who regulated the

traffic by special statutes and fixed the wholesale and retail prices at rates which were probably intended to be restrictive. In 1154 a duty of a shilling a tun was levied by the Court on Anjou wines, and little more than a century later the duty was doubled. Nevertheless, nearly nine thousand tuns of claret from Anjou and Gascony were imported into London and Sandwich in 1273. In the reign of King Edward I Bordeaux merchants were established in London in the Vintry Ward, and good Gascoyne wine could be bought at fourpence a gallon.

Notwithstanding many edicts directed against it, claret, or "clarrie," as Chaucer calls it, held its own and was highly appreciated and largely consumed by the English people. It is frequently mentioned by the Elizabethan dramatists. Shakespeare makes Jack Cade ordain that at "the city cost the conduit shall run nothing but claret wine the first year of my reign," and in *James the Fourth* of Greene, who probably died from an excess of Rhenish wine, published in 1598, Sir Bartram inquires of Slipper: "Where is the Master?" and is answered: "Why, in the cellar drinking a cup of neat and brisk claret in a silver bowl." At the end of the fifteenth century, however, Spanish wines began to compete with claret for public favour. After that claret had its ups and downs. In 1678 an Act was passed prohibiting the importation of French wine. This Act was rescinded ten years later, but renewed in the first year of William III with the futile hope that it would impart new life to British commerce.

Since then French wine has been the plaything of the Exchequer and its fiscal experiments. In the first half of last century, owing to the excessive duties imposed, the consumption of claret in England diminished by 700,000 gallons annually, but since the revision of the crushing tariff in 1860 the imports have shown a steady increase, the old taste for claret having in some measure reasserted itself. Of course at its highest point the consumption of claret in England has been insignificant compared with that of other alcoholic beverages. Of the total consumption of absolute alcohol in the United Kingdom in 1921, 79·3 per cent. was consumed as beer; 17·5 per cent. as spirits, and only 3·2 per cent. as wine, cider and perry. The average consumption of French wines in France is 26 gallons per head, whereas in the United Kingdom it is only $3\frac{1}{2}$ gallons.

But it was not through England that claret reached Scotland. It was rather Scotland's prolonged enmity to England that threw it into the arms of France and led it to adopt claret drinking and other French customs. The introduction of claret into Scotland was, however, in all probability contemporaneous with its appearance in England. When in 1097 the Atheling placed his nephew Edgar on the Scottish throne, he was accompanied by a body of Normans, and during the reign of David I the Norman element attained such a predominance as to become a formative force in the kingdom. Extensive assignments of lands were made to Normans, especially in Strathclyde, the Lothians and Fife, and it may be assumed that the settlers obtained

from the smacks from France, which frequently arrived in the Firth of Forth, supplies of the liquor to which they had been accustomed in their native land. But however it made its way into Scotland, claret took a far firmer grip of the people there than it ever did on those to the south of the Tweed, and permanently retained it.

Up to the end of the fifteenth century the ordinary beverage of the Scottish people was a light home-made ale, which was brewed in every village in the change house or tavern and in almost every farmhouse. The brewers were generally the publicans' wives, and the occupation would seem to have thriven with them, for a brewster's wife became a designation for a very stout woman. In 1661 twelve brewsters' wives, all of portly dimensions, undertook a race to the top of Arthur's Seat, 822 feet high, for a prize of a cheese weighing one hundred pounds. But the upper classes, while not forgoing ale, indulged also freely in claret, and it is surprising to note that notwithstanding the poverty of the country, it seems to have been imported in large quantities. When in 1640 Carlaverock Castle was surrendered to the Covenanting commander, amongst the bags, baggage, trunks and household stuff there were found in one cellar four barrels of the wine which Falstaff loved, and in another three hogsheads of claret. At the signing of the Solemn League and Covenant at Linglithgow on May 29, 1661, the King's birthday, "a fountain in the town ran plentously with French wine to the great joy of the inhabitants." In 1697 the Laird

of Culloden kept a hogshead on tap in his hall, ready for the service of all comers, and his accounts are alleged to show that his annual consumption of the article would at present prices have cost upwards of two thousand pounds. In Arniston House, the country residence of President Grant when Sheriff Cockburn was living there as a boy, there were sixteen hogsheads of claret used per annum.

But the imbibition of claret was not confined to the upper classes. Burt, travelling in Scotland in 1697, records it as a redeeming circumstance attending life in these bleak Northern regions that there was an abundance of wholesome and agreeable drink in the form of French claret, which he found in every public house of any note. The price, as it was duty free, averaged 5*d.* a bottle. When a vessel laden with the precious liquor arrived from Bordeaux at the Port of Leith, the owners immediately notified the fact by carting a number of hogsheads through the streets and causing the bellman to notify where the liquor could be bought. Casks were also hauled about in wheelbarrows and the claret sold in stoups. It was certainly claret that was quaffed at the leave-taking on the pier of Leith, as recorded in one of the most tender and moving of the songs of Burns, the first two lines of which, however, were written by Alexander Leslie in 1636.

“ Go fetch to me a pint o’ wine,
And fill it in a silver tassie,
That I may drink before I go
A service to my bonnie lassie.”

It is chronicled that at one of the stages of her flight southwards after the battle of Langside in 1568, Queen Mary was refreshed with a glass of claret, which must have conjured up visions of happier days.

In some parts of Scotland, however, the taste for claret seems to have led to serious excesses. The Hebrides had established a trade in it and partook of it not wisely but too well, for in 1609 its importation was forbidden by the Privy Council, and as this had no effect an Act was passed in 1616 "against the drinking of 'wynes in the Ylis.'" That Act recited that: "Forasmeckle as the grete and extraordinary excess in drinking of wyne, commonlie usit amangis the commonies and tenentis of the Ylis, is not only an occasion of the beastly and barbarous cruelties and inhumanities that fallis out amangis them to the offence and displeasure of God and contempt of law and justice, but with that withdraws numbers of them to miserable necessity and povertie, since that they constrayn, quhen they want, of their neihbouris. For remaind quahir, the Lords of Secrete Counsell statuis and ordainis, that nane of the tenentis and commonis of the Ylis sall at ony time hereafter buy or drink ony wynis in the Ylis or continent next adjacent thereto under the pane of twenty pounds to be incurrit by every contravene, toties quoties."

A still more stringent Act was passed in 1622, but these repressive measures, while they deprived the Hebrideans of the wines of Bordeaux, did not make

them more temperate; they had recourse to more potent beverages. Their ancestors had extracted a spirit of some sort from the mountain heather, and they now distilled usquebaugh, or whiskey, from barley. Whiskey supplanted claret in their affections and was drunk copiously, not only in the Hebrides, but also throughout the Highlands. Stills sprang up in every glen. In 1708, 50,000 gallons of whiskey were known to have been produced, but fifty years later the amount had risen to 433,800 gallons which paid duty, but what the quantity was that eluded the excise-man it is impossible to guess, for there were illicit stills in remote straths where the gauger dare not venture and the King's writ did not run. In many secluded districts the manufacture went on with impunity, lairds, baillies and justices of the peace being the best customers of the law-breakers. In Glenlivet alone it is alleged that there were in 1760 two hundred illicit stills at work, the kegs and bladders passing freely about on the backs of ponies to remote lochs, where vessels were waiting for their freight. Of the recognised distilleries the most famous was that of Forbes of Culloden, the whiskey from which, known as "Farintosh," paid no duty and was therefore cheap, exemption from the Act having been granted by the Scottish Parliament in 1698 in requital for damages suffered from the King's enemies. This privilege was withdrawn with payment of compensation of £21,580 in 1784, and was lamented by Burns on medical grounds in his *Scotch Drink*.

“ Thee Farintosh! Oh, sadly lost,
Scotland laments from coast to coast,
Now colic grips and barkin’ hoast
 May kill us a’,
For loyal Forbes’ chartered boast
 Is ta’en awa’.”

It was not until the middle of the eighteenth century that whiskey trickled down into the Lowlands. Up till 1750 the common people, as has been said, regaled themselves with ale, and the well-to-do classes combined ale with claret, which was good and cheap at a shilling the chopin when it came duty free from France. When Waverley visited the Baron of Bradwardine at Tully Veolan in 1745, the Baron in welcoming him expressed the hope that he would applaud his Bordeaux. “ C’est des deux oreilles,” he explained, “ as Captain Vinsauf used to say—*Vinum primæ notæ*, the Principal of St. Andrews denominated it.” At the banquet he carefully decanted a cobwebbed bottle of claret into the goblet which held nearly an English pint, and at the conclusion, delivering the bottle to the butler to be held carefully in the same angle with the horizon, he devoutly quaffed off the contents of the Blessed Bear of Bradwardine. At the *deoch an doruis* or stirrup-cup, at the change-house or tavern, to which, when the banquet was over, they adjourned, Lucky Macleary appeared with a huge pewter measuring-pot, containing at least three English quarts, familiarly denominated a “ tappit hen,” which in the language of the hostess “ reamed ” with excellent claret just drawn from the cask.

In upper class families at this time at the midday

dinner there were strong ale in ample supply and sack or claret. At "four hours," as it was called, equivalent to our afternoon tea, there were ale and claret of which the ladies partook, with a slice of wheaten bread or cake; and at supper, at seven or eight o'clock, there were again ale and claret. In every house, from the highest to the lowest, there was an abundance of ale, but a change in the habits of the people now began. In 1725 Parliament enforced an impost, hitherto evaded, of 6*d.* on every bushel of malt, and this seriously enhanced the price of what was really a valuable food. The tax was at first met with indignant defiance. There were riots in Glasgow and the brewers went on strike, but it was pressed home, and as unfortunately it synchronised with the introduction of whiskey from the Highlands, it had the disastrous consequence of causing a higher alcoholisation of the country generally. There was a rapid decline in the consumption of ale and in home-brewing, and "twopenny" gave place to whiskey.

But as the demand for ale declined that for a more potent substitute increased, and as the supply of whiskey was inadequate, contraband cargoes of wine, brandy, rum and gin were run in from France, Spain and Holland. Smuggling became a prosperous industry and was further supported by the taste for tea, a precious luxury, which then grew up. All round the Scottish coast, but especially in the south and west, where there was ready access to the Isle of Man, "fair-trading," as it was called, was briskly carried on and all classes of the community actually participated in it with rich

profits, or tacitly connived at it. I recollect in my young days dining at a big house on the Solway shore where after dinner our host suddenly disappeared from his place at the head of the table, but reappeared in a minute or two grasping a bottle of claret. He had descended through a trap-door in the dining-room floor and by a ladder to a cellar cut in the rock beneath the house, to which there was no other entrance and which had been constructed in smuggling days for the reception and concealment of claret and brandy. Brandy in those days disputed with whiskey for popular favour in the south and west, and in the old accounts of the Burgh of Dumfries there are frequently recurrent entries like the following: "Oct. 4. For brandy and syrup for ye Council after it cam down—£2 8s. od."

The substitution of whiskey for ale and claret as the popular stimulant in Scotland was a great national misfortune which still affects the country. The effect of alcohol is largely determined by the degree of dilution in which it is taken. The concentrated solution is absorbed much more rapidly and reaches a higher maximum in the blood, and so the intoxication produced by the stronger solution is more sudden and intense than that which follows on the weaker one. Even with the same amount of alcohol taken at the same time, the difference in intoxicating effects between concentrated and diluted solutions holds good. Dr. Vernon has shown that the errors in typing a memorised passage under the influence of a definite quantity of alcohol are 25 per cent. less numerous with a 5 per

cent. solution than with one of 20 per cent. strength. But another factor has to be considered in comparing the effects of concentrated and diluted solutions like whiskey and claret, and that is the rate at which they are consumed. The volume of concentrated solution of alcohol such as whiskey containing 20 per cent. of alcohol necessary to produce profound intoxication can be swallowed in a few minutes; whereas to imbibe the same amount of alcohol in a dilute form, such as claret, may take an hour or two of drinking. During the period of slow imbibition the alcohol is being absorbed and oxidised and the alcohol concentration in the blood is, therefore, in some measure prevented from attaining that high degree which corresponds with intoxication. It is the difference between a deluge and a drizzle. A dram of whiskey over a counter on an empty stomach is a dangerous form of alcoholic indulgence, whereas some pints of vin ordinaire containing the same amount of alcohol spread over an hour or two with or after a meal may be consumed without risk of drunkenness. Whiskey *per se* is not a social or convivial drink, and has to be converted into toddy in order to make it so, and the gloom of a party of men sitting round a table each with a glass of whiskey before him must be such as to encourage inebriety; but goblets of the good red wine, æsthetically suggestive, mellow, and with a unique charm, conduce rather to vivacity and genial sentiment. Violence is apt to come in the wake of whiskey; ale is a soporific; but claret promotes an expansive hilarity. The brands of whiskey,

too, from different distilleries lend themselves little to discriminative discussion, while there is endless room for debate over the subtle merits of the many châteaux and vintages of the Gironde.

But while whiskey made way among the masses of the Scottish people in the eighteenth century, claret was still in vogue among the well-to-do and educated classes. At the clubs of scribblers and men of letters that met in dingy taverns in the dark wynds of Edinburgh, it was claret that was circulated, and that was the potation of that wonderful fraternity of men of note who gave distinction to that epoch in Scottish history and made Edinburgh "a hotbed of genius." Allan Ramsay, Principal Robertson, Hamilton of Bangour, Dr. Cullen, Henry Erskine, Adam Fergusson, William Wilkie, Adam Smith, Lord Kames, Lord Hailes, Lord Monboddo were all claret drinkers. The autobiography of Dr. Carlyle of Inveresk overflows with claret in every chapter. David Hume used to entertain his friends at elegant dinners and suppers with the best claret, and in his will bequeathed to his friend Mr. John Horne of Kilduff "ten dozen of my old claret at his choice." That John Home, the author of *Douglas*, was partial to claret may be inferred from the often quoted verse of which he was the author—a protest against Pitt's Budget.

" Bold and erect the Caledonian stood,
Old was his mutton and his claret good ;
' Let him drink port,' the English statesman cried,
He drank the poison and his spirit died."

In the country as well as in Edinburgh, notwithstanding the seductions of port on the one hand and whiskey on the other, claret was the staple drink with the well-to-do. Substantial farmers as well as the lairds stuck to it. My great-grandfather, who in the last decade of the eighteenth century was tenant of the Dykes Farm on the estate of the Murrays of Polmaise in Stirlingshire, always had claret on the table at dinner. He was a rigid Episcopalian and Jacobite, and made it a rule to stand up in the chapel in Stirling when the prayer for the Hanoverian Royal family was recited, and it was his custom to assemble the family and the domestic and farm servants in the stable a few minutes before midnight on Christmas Eve, when claret and cakes were handed round. No doubt there was a majority of Presbyterians among the servants, and perhaps it was the claret that overcame their scruples and induced them to take part in the rite.

On festive occasions claret was sometimes consumed in prodigious quantities and apparently without the unpleasant consequences which we should now expect to follow on such indulgence. The men of that time who partook largely of claret without becoming intoxicated owed their immunity perhaps not so much to tolerance established by habitual use as to a greater constitutional insusceptibility than exists to-day.

Claret was the ammunition employed in the famous battle of "The Whistle" described by Burns, when three Nithsdale gentlemen of high standing met to contend for that relic supposed to have been brought

to Scotland by Anne of Denmark, the prize going to him who after the Bacchanalian orgy could blow the whistle last.

“ The dinner being over the claret they ply,
And every new cork is a new spring of joy.
In the bonds of old friendship and kindred so set,
And the bonds grew the tighter the more they were wet.

Six bottles apiece had well worn out the night,
When gallant Sir Robert to finish the fight
Turned o'er in one bumper a bottle of red,
And swore 'twas the way that their ancestors did.”

Although the best red claret at that time was obtainable at eighteen shillings a dozen, and poorer but still sound qualities at a much lower figure, it was beyond the reach of the exciseman who celebrated the fray, and so calamitously he resorted to the cheap fire-water which in Scotland had so largely displaced the generous juice of the grape.

Throughout the first half of the nineteenth century claret was still in high favour, and Sir Walter Scott patronised it liberally. “ He circulated the champagne briskly during dinner,” says Lockhart, “ and considered a pint of claret each man's fair share afterwards.” At the reading of one of the novels at Ballantyne's we are told “ the claret and olives made way for a mighty bowl of punch.” Constable maintained that Scott was at his best when he had “ a skinful of claret,” and there can be no doubt that, like Addison, who did his literary work as he walked the long gallery in Holland House between two bottles of claret, Scott derived some

help from it when under anxious pressure he had to perform a heavy task.

Claret was not at this time altogether discarded by the humbler classes, for Sir Andrew Bruce Tulloch recalls that in the 'thirties of last century his father saw it sold on draught in the streets of Perth. Then, and for another forty or fifty years, it was in its finer vintages the almost exclusive dessert wine in all the best houses in Scotland and in the North of England. The claret trade was at its best in Leith from 1848 to 1878, when wines of the great vintages '54, '58, '61, '64, '69 and '70 were eagerly sought after. I remember now with gusto the glorious wines that were offered at dinner parties in Edinburgh in the 'sixties—Margaux, Lafitte, Léoville, Longueville and Montrose—when Lord Neaves eulogised them:

“ To make life's pulses gaily go
 Not much too fast nor yet too slow;
 And joy without dejection know,
 Were worth a golden mine.
 Then try with me the simple art—
 If better views you can't impart
 To calm the brain and cheer the heart
 With a flask of rosy wine.

Cognac may better suit with some,
 Or gin and whiskey handier come,
 And Glasgow long was fond of rum,
 When merchants met to dine;
 But Prudence there her part should play
 The fire with water to allay,
 Or take instead to wet her clay,
 A flask of rosy wine.”

The first Lord Kinross, when he was Lord President, told Professor Saintsbury that "in his early days at the Scottish Bar (that was in the 'sixties) it was customary for knots of four frequenters of the Parliament House, when a vintage promised well, to lay down so many hogsheads of the best reputed first or second growths, dividing the produce in bottles amongst themselves. A hogshead of claret makes about 23 dozen, so the subscribers would have that quantity apiece of the vintage divided into lots of about five or six dozen of its growth." Lord Kinross added that he did not believe that any of his brethren did anything of the kind at the time at which he was speaking; and that must have been twenty years ago, and still less does anything of the kind go on now.

Edinburgh was at one time the headquarters of claret drinkers, but a falling off in the taste for claret began about 1878. Since then the liking for claret has more and more declined, so that of late years Professor Saintsbury found it practically useless to open a magnum. The decline and fall, leaving only a few connoisseurs still devoted to certain châteaux, has been due mainly no doubt to the late dinner hour, which gives no time to dwell on the delicate differences of bouquet in various vintages, and to cigarette-smoking, which blunts the palate and renders it incapable of fine distinctions. Drinking at meals has become less æsthetical than it used to be, more perfunctory and dietetic.

Traces of the old popular fondness for claret seem still to linger in some districts. An Argyleshire magistrate,

writing to *The Times* a few years ago, said that he had been recently in a Loch Fyneside hotel where the proprietor assured him that the herring fleet fishermen consumed about a hogshead of his light claret every week. They would not touch whiskey, being all either teetotallers or severe temperance men. Light claret, warm and with plenty of sugar, was considered to be a temperance beverage and was largely drunk when the men returned from fishing. That a liking for claret to the discomfiture of whiskey may be yet revived generally throughout Scotland is not impossible. Speaking on the French Treaty in 1860, Mr. Gladstone said: "There is a notion gone abroad that there is something fixed and unchanging in an Englishman's taste with respect to wine. You find a great many people in this country who believe like an article of Christian faith that an Englishman is not born to drink French wines. 'Do what you will,' they say, 'argue with him as you will, reduce your duties as you will; endeavour even to pour French wine down his throat, but still he will reject it.' Well, these are most worthy members of the community; but they form their judgment from the narrow circle of their own experience. What they maintain is absolutely the reverse of the truth, for nothing is more certain than the taste of English people for wine. In earlier periods of our history French wine was the great article of consumption here. Taste is not an immutable but a mutable thing."

That under some mutation of taste in Scotland a reversion to claret may take place is certainly much to

be desired. There is no alcoholic beverage more wholesome than a light, sound, relatively non-acid claret, none less deleterious in its effects even when taken to excess. During the Great War every officer and man in the French Army received half a litre of wine per day, the total amount requisitioned annually by the Government being 6,000,000 hectolitres, representing 792,000,000 large bottles. It was the opinion of the French Army Medical Staff that this wine allowance contributed in some degree to the magnificent health enjoyed by all ranks of the armies of the Republic, and was especially valuable during the trying conditions of trench warfare. In Gallipoli, too, French troops, who were well supplied with light wines of their country, suffered much less than the British troops from enteric fever and dysentery.

A necessary preliminary to any return to claret-drinking in Scotland is a reform and transformation of the public houses of the country, which should no longer be adapted to hurried drinking under squalid or gew-gaw conditions, but become restaurants or lounges to which a man may, without reluctance, take his wife and children, and where, under the refining influence of music and artistic decoration, nourishing and palatable food may be obtained.

LIGHT AND SANITATION¹

WE have Scriptural warrant as well as personal experience for believing that the "light is sweet" and that it is "a pleasant thing to behold the sun." But it is not only a pleasant but a wholesome thing to bask in the rays of that great luminary. It has long been held almost all over the world that certain salutary influences emanate from the sun, as part of his radiant energy. True, the sun has been accused of morbidic as well as of healthful operations. Snow-blindness, dermatitis, certain cutaneous eruptions and sunstroke have been justly laid to his charge, and, like the moon in the matter of lunacy, he has had to bear the blame of visitations of which he has been wholly innocent. Just as he has been unfairly suspected of putting out the fire, which the housemaid has neglected and the sloping poker has betrayed, so has he been wrongly arraigned for extinguishing millions of lives by drawing up from the earth that poison of malaria which the mosquitoes have been busily inoculating all the time. But whatever his pathogenic misdeeds, real or imaginary, may have been, they have been far more than counter-balanced, even in popular estimation, by his beneficent and healing powers, and in many countries we hear

¹ Address delivered at the Jubilee Conference of the Manchester and Salford Sanitary Association, April 24, 1902.

echoes of the common Italian proverb, "*Dove non va il sole va il medico*," "Where the sun does not enter the doctor comes," and find prevalent the practice of exposing to his bleaching and cleansing processes clothing, bedding and other articles liable to pollution. If we inquire, however, whether the ancient and catholic faith in the saving virtues of bright sunlight had any foundation on real knowledge, we shall find that that was not so. It seems to have been a vestige of heliolatry, or one of those empirical conclusions often popularly arrived at in anticipation of science, and when any rational explanation of it was attempted that generally amounted to the statement that it was the heat of the sun that was the active agent at work. It is only of recent years we have ascertained that the detergent and disinfectant effects of insolation are due not to any great extent to heat rays, but to other rays the hygienic properties of which had not before been surmised.

It was in 1877 that Messrs. Downes and Blount gave us the key to the rich storehouse of knowledge on this subject which has since been opened up, but which is yet only very partially explored, by showing that the growth of certain bacteria or microbes is retarded or prevented by exposure to light. They demonstrated that some bacteria cultivated in meat broth, which in darkness multiply at an enormous rate, cease to do so altogether in the direct rays of the sun, and only multiply very slowly in diffused daylight, and they practically disposed of the theory that it is the heating rays that bring about these results, by showing that

they are attained equally in tubes kept cooled in ice and in tubes unprotected from the thermal action of sunlight. But the vindication of the lethal power of light over micro-organisms was not yet fully accomplished, for the scientific sceptics—very useful persons—next suggested that the prejudicial effects of light on bacteria were brought about, not by the direct action of the solar rays on them, but indirectly by the decomposition caused by these rays in the medium in which the bacteria are grown. It has, of course, long been well known that the chemical rays of the spectrum promote oxidation in organic substances in solution, and it was argued that it was by their action on the meat broth in which the bacteria are cultivated that the bacteria were poisoned or starved, and so incapacitated or killed. Controversy revolved briskly round this question for a number of years, and was only finally brought to rest by the discoveries of Professor Marshall Ward in 1892. I would not in any way depreciate the value of the work done by Roux, Duclaux, Janowski, Geissler and other labourers in this field, but I unhesitatingly maintain that it was by a brilliant series of experiments conducted by Professor Marshall Ward that our knowledge of the relations of light to bacterial life and therefore to hygiene was first put upon a thoroughly firm and unassailable basis.

Professor Marshall Ward began his experiments with the anthrax bacillus—an exceedingly interesting organism bacteriologically, for it was the first of its kind that was incontestably proved by the researches of Davaine, Pasteur and Koch to be the one true cause of a specific

disease. This virulent micro-parasite which as splenic fever has so often decimated flocks and herds in many parts of the world, and which as wool-sorters' disease occasionally claims a few human victims in Bradford, has well-marked features, and consists of minute, sharply defined rods, arranged in chains and extending into filaments, in the substance of which may be seen highly refractile points growing into minute oval bodies, which are spores or seeds, which, amongst the bacteria, or fungi, are endowed with far greater tenacity of life than the parent organism. It had been noticed by Straus and Frankland that when the anthrax bacillus, suspended in water, was exposed to sunlight, it rapidly disappeared, and this was supposed to be due to the spores germinating out into slender bacteria which are then killed off and so end the generation. But Marshall Ward was not satisfied with this explanation and proceeded to investigate for himself. He took two glass tubes containing distilled water, infected them equally with the spores of anthrax, exposed one to light and kept the other in the dark, and found that in the former the spores disappeared or were exterminated, while in the latter they survived in their teeming millions.

He took a drop of water infected with anthrax spores, mixed it with gelatine, divided this gelatine between two saucers, allowed it to stiffen or set, exposed one saucer to light for a few hours and kept the other in the dark, and found that in the former the gelatine remained clear, while in the latter it had become opaque—a difference the meaning of which the microscope revealed, showing that in the gelatine exposed to light

the spores had not germinated or sprouted because they had been killed, whereas in the gelatine kept in the dark the spores had germinated and sprouted into innumerable colonies or shrubberies of bacteria which caused the opacity observed.

He took a shallow glass dish into which he poured some gelatine, through which 5,000,000 spores of anthrax had been evenly diffused, and this gelatine having been allowed to stiffen into a film, he covered with a zinc stencil plate out of which a letter of the alphabet, say **T**, had been cut, and then wrapped up every other part of the dish with tinfoil and black paper, so that no light could reach any part of the film except what passed through the **T**-shaped opening in the stencil plate. Thus prepared, the dish was exposed to sunlight reflected from a mirror for two or three hours. After that its wrappings and the stencil plate were removed, and it was placed in an incubator where a temperature suitable to the germination of spores was maintained for 24 hours. And then the dish was examined and with this result, that the spores embedded in that part of the gelatine that had been covered up and kept in the dark were found to have germinated and sprouted into colonies, making the gelatine opaque, whereas the spores in the **T**-shaped area exposed to light had not germinated but were dead. The letter **T** was sharply printed in the gelatine, because the spores included in that area had been killed by the light, and so had produced no colonies interfering with its transparency and leaving it a sterile desert, while the spores beyond

it kept in darkness had grown luxuriantly into a forest of bacteria and made the gelatine dark and shady.

These and other varied experiments made it abundantly clear that the anthrax bacilli and their highly resistant spores are killed and rendered innocuous when played on for a few hours by sunlight, and the significance of this fact is only fully understood when we remember that these same spores may be boiled for a few minutes without injury and may be kept in the dark for days at temperatures far higher than that of direct sunlight without any impairment of their germinating power. Clearly, then, it is not the heat but the light of the sun's rays that is inimical to them. But then the question arises: Is this inimical action exerted on their own substance or on the foodstuff in which they are embedded? Clearly on their own substance, for the dried spores grow freely when sprinkled on agar (a jelly made from Japanese seaweed) which has been exposed to strong sunlight and its oxidising action, if only they have been kept in the dark and are so kept after being thus sprinkled, and they will not grow at all when they themselves have been exposed to sunlight while the agar jelly has been kept in the dark. Moreover, these dried spores will grow freely on gelatine, in which other spores have been killed by exposure to light, if only it be kept in the dark, thus showing that no toxic element has been evolved in it during its sunlight exposure.

By using screens of various coloured solutions, bi-

chromate of potash, fuchsine, methyl-blue, gentian violet, etc., side by side with screens of pure water, placed on agar plates sown with spores, Professor Marshall Ward succeeded in showing that there is no perceptible bactericidal action behind any screen which cuts off the blue violet rays, whereas the bactericidal action is the more pronounced the more these rays are transmitted. Engleman had previously observed that certain chromogenic bacteria when examined in a drop of water illuminated with a micro-spectral objective invariably made their way to the part of the spectrum farthest from the violet end. As if impelled by an instinct of self-preservation, they shunned those rays that were injurious to their constitution. Improving on Engleman's method, Marshall Ward proceeded to shine the spectrum itself directly on a film of spores, making the latter record the result. By ingenious contrivances, he obtained a very pure spectrum sufficiently rich in blue and violet rays, and experimenting with this photographically he was able to show, first, that the infra-red, red-orange and yellow rays are totally without effect on bacteria as shown by the bacteria exposed to these rays having germinated and developed as rapidly and as strongly as those in the dark; secondly, that the bactericidal effect occurs in the blue-violet region, diminishing in intensity at both ends as we pass into the green to the left and into the ultra-violet to the right; thirdly, that the most destructive rays are the blue rays to the right and the violet rays. By further experiments he established that it takes a bacillus in

blue light the same time to grow 50 units that it takes one in red light to grow 1200; in other words, that blue light reduces the vital energy of the bacillus to one twenty-fourth of its normal standard.

Marshall Ward experimented with the anthrax bacillus, but that is one of the hardiest members of its tribe and we may feel sure that what destroys it will still more readily and rapidly destroy many other disease-causing microbes, more especially those that are non-spore-bearing, and that whatever weakens it will *a fortiori* enfeeble them. As regards the typhoid bacillus, Janowski has shown that it too is susceptible to luminous influences which exert a depressing effect on its protoplasm, and when liberally applied render it incapable, not only of further development, but also of continued life. As regards the tubercle bacillus, that omnipresent and most cruel enemy of our species, Koch showed that it is destroyed by exposure to direct sunlight for a sufficient length of time, and Dr. Ransome has, in conjunction with Professor Delapine, advanced beyond mere laboratory experiments and satisfied us that short exposure to sunlight and air under conditions precisely analogous to those which exist in our homes and places of public assembly, and in the hovels of the poor, deprives the tubercle bacillus even of a virulent type of its power of evil. Of course it is difficult under such circumstances to distinguish between the effects of light, air and drying, but the trials instituted by Dr. Ransome, taken in connection with the laboratory experiments already referred to, leave no doubt that the tubercle

bacillus is burglarious in its habits, loves darkness rather than light and—like the treacherous delinquent that it is—cannot look the sun steadily in the face.

But the sanitary services of sunlight are not confined to *terra firma*. They have an important effect on the purification of rivers. It is a well-known fact that a river, despite contamination at a given point, may show little or no evidence of this contamination at a point further down in its course. Buchner added to water 100,000 colon bacilli per cubic centimetre, and found that all were dead, after an hour's exposure to sunlight. He also found that in a clear lake the bacterial action of sunlight extended to a depth of about six feet. Sunlight must therefore be taken into account, as an agent in the purification of water in addition to sedimentation, oxidation and the action of algæ.

Much patient investigation is yet necessary as to the action of light on bacteria. We want to know its action in different degrees of intensity on different species in different surroundings, but even now what we know of its action on the disease-causing varieties warrants us in hailing it as a sanitary ally of the first puissance in our combat with disease. That cannot be too strongly insisted on. We know already that bright sunlight is fatal to many of our most dangerous and insidious enemies amongst the bacteria, and that even the feeble rays of the winter sun will often suffice for their destruction. We know that the slow and sustained action of light even of comparatively low intensity on these bacteria, when they are not killed by it, so alters their behaviour that they are afterwards different from

bacteria not so acted on in their power of fermenting organic substances. We know that when the spores of bacteria escape into the air, and are there enveloped in the direct rays of the sun, they gradually deteriorate and lose their pernicious qualities. We seem to understand why epidemics due to parasitic fungi are so often associated in people's minds with dull, cloudy, sunless weather. We realise that that pencil of sunlight that our planet intercepts and that whisks round its circumference daily in its revolutions on its axis, is, if I may use an ignoble simile, like a mighty broom, sweeping before it much noxious and injurious matter. We conclude that it is a sanitary obligation upon all of us to give the light free play, to do nothing that can hinder or obstruct its salubrious progress.

The discoveries to which I have been referring, as to the action of light on bacteria and as to the utility in preventive medicine of a human photosphere in warding off bacterial attacks, naturally suggested the employment of light in curative medicine also. If light is efficacious in disarming pathogenic bacteria while they swarm around us in earth, air and water, why should it not be efficacious against them also when they have effected a settlement in the body? Lodged deeply in its cavities and crevices they are obviously inaccessible to light, but located on or in the skin they ought to be amenable to its persuasion, especially as the actively bactericidal rays can penetrate the skin to some extent. That thought occurred to me in 1894, and I resolved to try whether light had any influence on lupus, an inveterate, disfiguring and slowly encroaching disease

of the skin due to its invasion by the tubercle bacillus, or by a bacillus scarcely distinguishable from it. I had, accordingly, made, by Arculus of Birmingham, a number of nests of coloured glasses, white, red, yellow, signal green, blue, etc., of various sizes and exactly the shape of the cupping glasses formerly used in blood-letting. I proposed to experiment with these on patches of lupus, applying them with a spirit flame, just as cupping glasses used to be applied, and I calculated that through them coloured light would operate on the skin under advantageous conditions, for the mound of skin raised under the exhausted bell-shaped glass would be stretched and expanded so as to give the light ingress to its folds and would be in a partial vacuum which should prove an auxiliary to the light, for the tubercle bacillus is aërobic and requires oxygen for the maintenance of its existence. I tried the blue-violet glasses in just one case, as I thought with a trace of benefit, but I soon realised that my official duties made it impossible for me to carry on the elaborate and protracted observations necessary, so I handed the glasses to my friend, Mr. Malcolm Morris, the eminent dermatologist, who thought them deserving of trial. But before he had gone far in the matter there was announced another method of employing light in the treatment of lupus incomparably superior. Even strong sunlight in summer takes an hour to kill bacteria in plate cultures, and must take a much longer time to kill them when they are entrenched in the skin, and its bactericidal energy is therefore perhaps too feeble for therapeutic purposes. In view of this difficulty, it occurred to Dr. Finsen of

Copenhagen to concentrate light, whether that of the sun or of the electric arc lamp of 50 to 80 amperes, so that as many blue, violet and ultra-violet rays as possible might be obtained, and by ingenious contrivances he succeeded in procuring a light which will kill bacteria in a thin stratum of agar jelly in a few seconds and which has a powerful effect on some skin diseases of microbic origin. In dealing with sunlight, Dr. Finsen passes it through a lens composed of a plane glass and a curved one, which are framed in a brass ring, having between them a bright blue ammoniacal solution of sulphate of copper. As one surface of the contained liquid is plane and the other one curved, its optical function is that of an ordinary plano-convex lens, while being composed of water it absorbs the ultra-red rays and cools the light, and being of blue colour it excludes a considerable number of the red and yellow rays. The rays thus excluded are those which have a strong heating effect and would cause burning or scorching of the skin, and those transmitted are the bactericidal constituents of the light. In dealing with the arc light Dr. Finsen uses two sets of lenses of quartz, which in a higher degree than glass permits the ultra-violet rays of shortest wave-length to pass, and these are separated by distilled water not coloured blue, which cools the light by absorbing the intensely heating ultra-red rays without impairing the blue-violet and ultra-violet ones. Through these two forms of apparatus—the one for use in summer, the other in winter—concentration and cooling of the light are effected, but it would be still too warm for application to the skin, so it is passed through

a little chamber formed of a plane and plano-convex lens of quartz through which cold water flows, and which is pressed down on the skin, producing anæmia by forcing out the blood, in which state it is more permeable to chemical rays. Through the lenses described fixed in a telescope case the light passes and is focused on the part on which it is desired to operate by the physician or nurse, whose eyes are shielded by blue spectacles, and by the employment of light in this way, as well as by the employment of X-rays, which have been pressed into the service, very remarkable results have been obtained. The light treatment, as I have said, was first made practical and efficient by Dr. Finsen in Copenhagen, and there it came under the notice of Queen Alexandra, who, being convinced of its utility and being always zealous for the welfare of her adopted people, arranged for its introduction into this country. The first installation was at the London Hospital, under the direction of Dr. G. W. Sequeira, who by the arc light and a transformer secured a light of sufficient intensity and obtained encouraging results. Other public and private installations have since been established and ample home-testimony has accumulated as to the value of the light treatment. In lupus its effects are sometimes little short of miraculous, and it is to be hoped they will be permanently maintained. It has made comely, or at least presentable again, faces that had been seared and seamed and rendered hideous by the ravages of that disease, and has thus brought back to social life unhappy beings who had had to hide themselves away for very shame of their appearance.

It has set up healing action, even where extensive tracts of skin have been eaten away, and in milder cases it has ensured a rapid recovery. In other fungoid diseases of the skin such as favus it has yielded results unapproached by any other expedient, and, more momentous still, it has proved efficacious in some kinds of cancer of the skin. In what is called rodent ulcer, a slowly gnawing, malignant disease of the cutaneous tissues, formerly regarded as incurable except by extirpation by the knife, the effect of the X-rays has been a revelation. They have induced healing in some cases of ulcers of a chronic and obstinate type that, owing to their situation and extent, were inoperable. In such cases the action of the light cannot be positively affirmed to be bactericidal, for we do not know, though we may suspect, that rodent ulcer is due to a bacterium or a protozoon, and indeed, in many cases of lupus competent observers are inclined to attribute the beneficial influence of the light, not so much to its lethal power over the bacilli, as to the inflammatory reaction it sets up or to the growth of epithelium which it stimulates. But whether by killing the microbes themselves or by rendering the tissues in which they are ensconced uninhabitable by them, too hot to hold them, the light treatment is eminently efficacious in several microbic skin diseases.

It is not a panacea, it cannot supersede altogether other methods of treatment, it is not painless, it is sometimes tedious, a great number of sittings being required, and yet it is a great advance on anything previously known, a balm in Gilead, a sovereign cosmetic to crowds of grievously afflicted persons, and it affords

triumphant proof of the power of light to search out, and as with Ithurian spear touch and transform some of our hidden and venomous foes.

I have spoken of light as purifying our atmospheric environment and as freeing us from certain superficial parasitic distempers, and I wish now to remind you that it has still more deep and intimate human relations of a sanitary nature; for light is a necessary condition of mental and bodily well-being. Its tonic psychical effects are everywhere recognised. All properly organised men and women love the light, and it is not merely to children that darkness brings with it a sense of powerlessness, danger and alarm. Essential for all the purposes of life, for the supply of oxygen on which existence depends, light is an universal stimulus. Falling on the eye, it sets up in the brain functional activities, associated with intellectual and emotional states, and attempts have been made to discriminate the psychical effects of its different elements and to employ coloured light in the treatment of mental disorders. These attempts cannot be said to have been hitherto very successful, but still it is curious to note that many independent observers—indeed, I believe, all observers who have written on the subject—have arrived at the same conclusion, that the blue rays are depressing and the red rays exciting to the brain. Esquirol and Rösch both said that indigo dyers are disposed to melancholy and that those who dye scarlet become choleric. Goethe once remarked that the tone of conversation changed from grave to gay as a company migrated from a blue chamber to one that was decorated in crimson, and more specific

and reliable data have been furnished by medical men who have tried the cutting off of the chemical rays in order to prevent pitting in small-pox. In several places the experiment has been tried of keeping patients labouring under that dire disease in wards and rooms with windows of deep red glass and with artificial lights shielded by deep red globes, and the invariable evidence of those who have watched this treatment is that it is exceedingly trying both to patients and attendants. The exclusion of the blue, violet and ultra-violet rays which are capable of irritating the healthy skin and which aggravate pre-existing inflammation of it does apparently diminish the scarring left by small-pox, but constant immersion in the red rays seems to excite the brain. Olienikoff has recorded that all his variolous patients kept in red light became much disturbed in mind and in some instances delirious, and Dr. Ricketts found nervous symptoms rather prominent in the small-pox patients treated under red light in the Joyce Green Hospital at Dartford. "One child," he says, "got into a really dangerous state of mental apathy. Some of the patients were excited by the treatment, and we thought it conduced to headache and delirium. Many of the nurses made no objection to being in the red room, but others strongly objected. I found myself that it had a very curious oppressive effect and I can quite understand its upsetting those with an unstable nervous equilibrium." At Lyons, where this treatment was tried, four women patients submitted to it became greatly agitated and begged to be placed in ordinary daylight again, while the nurses were unable to go on

with their duties without blue goggles. The peculiar influence of red light on the minds of those habitually steeped in it has been seen amongst the workpeople of the Lumière Company of Lyons. The rooms where photographic plates and papers are handled were illuminated by red light and it was not unusual to find some of the workmen labouring under considerable mental excitement. But since green glass, which also stops the actinic rays, has been substituted for red such cases no longer occur.

The idea of employing coloured light in the treatment of insanity occurred a number of years ago to Dr. Ponza, the medical director of the asylum at Alessandria, in Piedmont, and he consulted on the subject Father Secchi, of Rome, who strongly advised an experimental investigation, predicting that violet light, which is melancholy and depressive, would probably calm the nervous perturbation of maniacs. Following the instructions of the learned Jesuit, Dr. Ponza had several rooms fitted with blue and red windows and with walls and woodwork painted to correspond, and in them he placed lunatics under observation, with very favourable results in some cases. One patient affected with morbid taciturnity became loquacious and affable when kept in a red chamber, and an excited madman in a strait-waistcoat, after one day in a blue room, was composed and rational. Dr. Ponza concluded from his experiments that the action of blue light is very intense as a mental sedative, and that red light is a mental irritant. Experiments on the same lines with those of Dr. Ponza have been undertaken in two or three asylums in this

country and have been disappointing, but they have not, I think, been conducted in a thoroughly scientific or searching manner, and the subject still awaits further investigation. Coloured light cannot be expected to de-idiotise a micro-cephale, to dissipate a cerebral tumour, or to remedy the degenerative changes of general paralysis or senile decay; but in functional, mental and nervous disorders—in neurasthenia, for instance, that very prevalent and distressing malady in these days—it is possible that skilfully used it might afford relief. I experimented with canaries placed in cages encased in coloured glass some years ago. Those in the blue cages became still, songless and listless; while those in the red cages were exceedingly restless, fidgety, and noisy.

But whatever the therapeutic values of the different rays of light may be, white light, Heaven's own mixture, is the normal cerebral atmosphere, and variations in its intensity have probably widely diffused constitutional effects. These, however, are not always immediate and obvious but often remote and subtle, and grave errors have arisen from confusing the primary psychical with the secondary somatic consequences of light in the human organisation. Thus Montesquieu affirmed, and his affirmation has been repeated innumerable times and has become almost a popular aphorism, that suicides are most frequent in November, when winter looms ahead, when the air grows damp and chilly, when mists and clouds shut out the sunlight and give rein to the melancholy passions. But Montesquieu's affirmation was an instance of what we might paradoxically call

the *a priori* induction—and the *a priori* induction is generally wrong. He felt that to his sensitive nature the sunless November was gloomy and depressing, he extended his own experience to mankind generally, and inferred that they too must be gloomy and depressed at that season, and he went on to assume that the supreme expression of human gloom and depression, suicide, must be most frequent then also. He stated therefore dogmatically that suicides are most frequent in November and in doing so he stated what is the exact opposite of the fact, for statistics that, since his time, have been collected in great abundance make it certain that in all countries north of the Equator suicide reaches high tide in May and June and is at ebb in November and December. Unhappily suicide is of diurnal occurrence and its high water-mark is steadily rising, but it has its seasonal flux and reflux, is at a maximum in spring and early summer, and at a minimum in early winter. But in this there is no reflection on the sunlight. Its cheering and sustaining psychical rôle remains unimpeached; the sadness that follows its withdrawal is indubitable as ever. May is still the merry month. November the harbinger of sombre thought, and if we would explain why the curve of suicide does not correspond with that of the gaiety and gravity of nations, we must look a little more closely into its nature and antecedents.

We must note in the first place that suicide, while it may be precipitated in those already fully charged for it by some passing external impressions, is almost invariably the culmination of long-heaped-up miseries

and disappointments and that its basal condition is often widely separated from its accomplishment. It was not the pulling down of the blind in June that made this man rashly end his days, but the bereavement that befell him at the winter solstice. We must note next that suicide is really a nervous disease, and like all other nervous diseases is most prone to occur at periods of nervous evolution and disturbance, and therefore it is that it is more frequent in spring and early summer when a great constitutional upheaval is going on. Man is not exempt from the operation of that vernal revival, the effects of which are so conspicuous in connection with plant and animal life.

“ In the Spring a livelier iris changes on the burnished dove,
In the Spring a young man's fancy lightly turns to thoughts of
Love.”

In the Spring there comes, be it observed or not, in all human beings a state of vital erethism or excitement that brings with it a susceptibility to morbid influences, and is apt to lead on to disease of the brain and nervous system in those predisposed to it. The death rate from all nervous diseases goes up at this season and so does that from suicide, the increased prevalence of which must therefore be attributed to deeply ingrained tendencies which the superficial exhilaration of the swelling sunlight is powerless to counteract.

But we must note further that the periodic variations in the occurrence of suicides when more closely scrutinised really bear strong testimony to the beneficence of the solar rays, not in their transient but in what I may call their cumulative, deferred and persistent

effects. When are suicides least frequent? Why, just at that season when summer and autumn are over, when the brain and body have been saturated for months with copious libations of sunlight and so have been recuperated and fortified. When are suicides most frequent? Why, just at that season when winter is over, when the brain and body have been for months stinted of sunlight and so have been reduced and debilitated.

And this brings me to the point which I particularly wish to emphasise, and that is the influence of light on the nutrition of the human organism. In a general way it is recognised that light has everywhere intimate relations with living protoplasm, and in the case of plants the rôle played by sunlight in their metabolism has been accurately defined. We know that in all green plants—that is to say, in plants containing chlorophyll, which may be likened to their blood—exposure to sunlight is essential in order that they may construct organic substances from the material of their food. When sunlight is supplied to them they appropriate its radiant energy, absorb carbon dioxide and give off oxygen, assimilate food, increase in weight, exhibit growth and manifest augmented functional activity generally. When that is withheld from them they cannot form chlorophyll, their absorption of carbon dioxide diminishes, they fail to make substantial growth but put forth long and slender shoots, they become etiolated or of a pale yellow or whitish colour, deteriorate generally in habits and structure and in a longer or shorter time dwindle and die. There can be no doubt that light, and more

particularly those rays which are found at the junction of the orange and red in the solar spectrum, exercise a powerful control over the constructive metabolism or tissue-changes of all green plants, that they are necessary, not only for the first formation of chlorophyll, but also for its maintenance during the whole life of the organs in which it exists, and that they also indirectly affect the absorption of mineral matters by the roots. There can be no doubt, further, that there is a relation between the intensity of light and the decomposition of carbon dioxide in plants, for that process slackens when light is feeble and is most active when it is at its optimum of brightness. The whole vegetable world, as we know it, is dependent on light for its being, and can only flourish when and where light is plentiful, and is ever ready to make the most of it, as witnessed by the copious vegetation of the brief Arctic summer.

As regards animals, their nutritive and functional relations with light are not so clearly marked out. Many of them practically live in darkness, to which they become specially adapted, but an enormous preponderance of them sport in the sunbeams, and to them those sunbeams have become indispensable conditions of health and vigour. Diurnal animals do not thrive in darkness and human beings immured in it for any length of time lose weight and strength and become blanched like an etiolated plant. We have only to contrast the people, who are in "populous city pent," dwelling in narrow streets, in dingy courts, in tenebrous tenements or Cimmerian cellars, and working in dusky shops and factories, with those who labour in

the fields under the blue sky, and shelter in cottages or in hovels, it may be, open to the weather, bathed in all the sunshine that our climate affords in order to realise that light is salutary and darkness deleterious. Of course numerous factors contribute to the physical differences which distinguish town from outdoor workers, and it is not easy to disentangle the influence of defective illumination from that of stagnant air, foul emanations, disease germs, over-crowding and fast living in the one case, and the influence of adequate illumination, pure air, active exercise, wholesome food and tranquil ways in the other. Yet, on the large scale, it cannot be gainsaid that sunlight is an important member of that confederacy of outward influences that makes for physiological righteousness. We have an indication of its activity in this direction in the bronzing of the skin that it induces. Pigmentation of the skin to which bronzing is due may be caused by low temperatures as well as by sunlight, but when of sunlight origin it is a sign of vital energy, and, indeed, the capability of cutaneous pigment formation is to some extent a measure of constitutional strength. The absence of pigment is often associated with weakness. Albinos are invariably feeble creatures, and in the case of the cat are often deaf and in that of the horse short-sighted, and stock-breeders have a strong prejudice against pure white animals, alleging that they are delicate and difficult to rear. Then the production of pigment in human beings of the white races requires a certain substratum of stamina, for healthy people bronze easily and sick people only with difficulty and slightly. Chlorotic and tuber-

cular subjects, indeed, may be freely exposed to the brightest sunshine and retain their pale complexions, and in consumptives, under the open-air treatment, the appearance of bronzing is often the first signal of returning health.

But sunlight penetrates much deeper than the skin. It quickens the circulation, it increases the oxidation in the body, it enriches the blood, it promotes nutrition in every organ and tissue. But how, it may be asked, does light do all this, seeing that in man and the higher animals its access to the body is so limited? We could understand its widespread sway, it may be said, if the whole surface of the diaphanous skin were habitually exposed to it, so that the corpuscles of the circulating blood, like the corpuscles of chlorophyll in plants, might drink in its kinetic energy and the cutaneous nerve-endings be stimulated by it. But as a matter of fact man and the higher animals practically live to a large extent in darkness. They spend a third part of their time under the shades of night; they hide themselves much during the day, in the mirkiness of dens and houses; and they are covered with fur, wool, hair or clothing so that light cannot reach the skin at all or only in feeble dilution. In man—even in those of us who are bald and do not wear gloves—only about one-eighth part of the surface of the body is directly exposed to the influence of light.

Well, the answer to that is that in the higher animals the whole history of evolution consists in the gathering up into special channels of functions that were at one time generally diffused. Touch and the senses of pain

and of temperature are still maintained over the whole periphery—although even they concentrate themselves in certain specialised cutaneous regions, but taste and smell have been focused on certain tracts of mucous membrane and hearing has had constructed for it a mechanism of exquisite contrivance. The aërial vibrations of sound—caused, say, by the voice of a speaker—still throw the whole body into a state of tremor, but they are perceived in those who are not deaf, not through the feeling of general sensibility, but through the ear and auditory nerve. And so the undulations (or shall I say the corpuscles?) of light which in plants and lower creatures exercise whatever effects they may possess upon the organism, through its whole superficies, in the higher-animals and man operate upon it mainly through the retina of the eye, and its brain-field. And not only have those generally diffused superficial impressions which were the rudiments of vision been lifted into the eye and raised to an immeasurably higher power, but with them have gone up in great measure, I would maintain, the nutritive prerogatives of light. These are exercised no longer directly upon millions of multitudes of cells, but reflexly through an autocratic and unifying brain-centre. The light impinging on the retina, stimulating the nerve-endings of the optic nerve, and initiating impulses which are conveyed to the brain, not only sets up sensations and visual judgments, but has a secondary trophic or nutritive effect. Its influence is not confined to the visual area in the occipital lobes and angular gyrus of the brain, not to other sensory and motor areas welded to them, but extends to some

nutritive centre that regulates the building up and breaking down of protoplasm and the contraction and dilatation of blood-vessels in remote parts. We must not imagine that the light gets no further than our eye and brain. It goes all over us in spite of our clothes and insinuates itself into every nook and cranny of the body. It is not easy to give demonstrative proof of this in the human being, but that may be afforded in the case of some animals.

And in this connection the Amphibia supply us with instructive material, for in them we can trace out the direct and reflex actions of light co-existing very obviously. They have naked and sensitive skins and complex and sensitive eyes and they have, moreover, movable pigments in their skins which respond to light, giving rise to changes in colour. These pigments, black, red, yellow or green, are contained in cells called chromatophores, placed immediately beneath the transparent epidermis, and these cells can contract, withdrawing the pigment from the surface and making it look pale, or dilate and spread it out near the surface, giving it a darker or more saturated tint. By the movements of these chromatophores in conjunction with a fixed white pigment, and with interference of light by structure, producing blue and violet colours, these creatures, and especially the chameleons and tree frogs, appear in many varied and beautiful liveries, which are changed in accordance with environment and disposition. The paramount object of these varied liveries is concealment, and so the animal assumes a pattern skin to its surroundings. What has been called natural

photography goes on. The frog that sits on the grass or amongst green leaves grows green, the frog located on granitic soil becomes speckled; the frog haunting a dark moorland dons a brown costume. These changes, which are slowly established, are attributable to the influence of light and colour playing directly on the skin, but other more rapid changes, as Lord Lister long ago proved, are produced, not by the direct action of light on the skin, but indirectly by its action on the optic nerve and retina. A hood of black cloth carefully arranged so as to exclude light from the eyes without interfering with respiration infallibly prevented a dark frog from becoming pale when exposed to bright sunlight, as it invariably did when thus exposed with its eyes uncovered. Desirous of ascertaining through what efferent channels the nervous impulse that caused concentration of the pigment on exposure to light was conveyed from the brain to the foot, Lord Lister divided the sciatic nerve—the great nerve of the hind-leg—but without effect on the colour of the limb. He then tried division of all the structures in the thigh, except the bone, femoral artery and sciatic nerve, but again without effect. When, however, he added to the latter procedure section of the sciatic nerve, the animal being then pale, it gradually grew dark below the seat of operation till in no long time the leg presented the appearance of having had a black stocking drawn over it, while the body and other limbs continued pale. All these parts were equally exposed to sunlight, but the darkened leg was cut off from reflex influence from the retina which was still operative upon the body and

other limbs. It thus became clear that the regulation of this function of pigment distribution in the frog, which is probably closely allied to the action of the cells in nutrition, is not carried on by special nerves, as in the case of the contraction of ordinary muscles, but that all the nerves going to the limb have trophic functions. The changes that take place in the chromatophorous cells of the skin of the Amphibia under the influence of light, namely, contraction with drawing in of their fine ramifications and concentration of pigment, remind us of the changes that, according to some of our most recent observers, take place in the neurone or cells of the brain in the transition from the sleeping to the working state, when their branching processes and terminal buds are said to be retracted, and of course of all external stimuli light is the one that is most potent and universal in determining that transition.

It seems curious that nervous action should make the pigment molecules rush rapidly to the centre of the cell from its extreme ramifications, and yet this is not more wonderful than a sudden gush of tears or outburst of perspiration under nervous influence, and both of these phenomena may be induced by excessive stimulation of the retina by light.

Lord Lister's conclusions as to the physiological mechanism by which rapid changes of colour in the Amphibia are effected have been confirmed by many subsequent observations and experiments. It has been shown that frogs that have been artificially blinded have no power of altering their colour so as to cor-

respond to surrounding tints, and the same has been proved to be the case as regards other animals. Pouchet noticed that a single plaice out of a large number on a light sandy surface was dark coloured and therefore unlike its surroundings, and examination revealed that this plaice was blind, and so unable to respond to the stimulus of light. Mr. H. Nicoll observed that in addition to the light-coloured trout usually seen in a chalk stream in Hampshire (a tributary of the Test) very dark individuals were occasionally met with. He was puzzled by this for a time, but the fact that the dark fish could not be induced to rise to a fly finally led him to discover that they were invariably blind, the crystalline lens having become opaque. Sometimes a fish was blind in only one eye, and then his colour was not affected. The darkness of the fish came on gradually with the increasing blindness. Green frogs always become dark some time before they die, which may be taken as indicative of a loss of nerve control over the pigment cells: the connection between these pigment cells and the nerve-endings has not been traced, but that some influence passes is unquestionable.

In many other ways the systemic influence of light impinging on the nerve receptors of the retina has been established. Moleschott found that frogs exposed to light expired from one-twelfth to one-fourth more carbonic acid than frogs kept in the dark, and the quantity of carbonic acid expired in a given time may be taken as a tolerably accurate indication of the rate at which tissue change is going on in the body. The increased rapidity of tissue change in the frogs exposed to light

might, of course, be due to the direct action of the light on the skin, but subsequent experiments by Van Platen indicated that it must be traced to the action of the light upon the eyes. He kept a number of rabbits as nearly as possible under the same conditions, but sometimes covered their eyes with dark glasses so as to exclude the light, and sometimes with white glasses so as to allow it to act upon them. The experiments made in this way showed that when light was allowed to reach the eye, the carbonic acid was from one-sixth to one-seventh more in amount than when the light was shut off.

Experiments at the Smithsonian Institute showed that birds present the same diurnal rhythm of temperature as occurs in warm-blooded mammals, but in nocturnal birds such as owls the normal rhythm was reversed, the temperature being highest during the period of activity at night and lowest during the period of rest by day. But this diurnal rhythm could be reversed in day birds by keeping them in darkness during the day and exposing them to artificial illumination during the night. As in birds the skin is effectually protected by feathers from the influence of external temperature and light, it seems more than probable that the changes in body temperature induced by light and darkness respectively are brought about through the eyes, the heat-regulating mechanism being responsive to retinal impressions.

The direct influence of light on the skin is not, of course, abrogated in human beings. The races that still go about "in native worth and honour clad" no doubt benefit by that influence, but civilised races that

have encased themselves in raiment have been content to a large extent to forgo it. But in them, too, under certain circumstances, the exposure of the whole cutaneous surface to light seems to have a tonic and stimulating effect. Light playing upon the skin in some way not yet understood seems to produce something that energises the whole body. Basking in the sun is one of the chief pleasures of many animals and of not a few races of men. The ancient Romans believed it made the skin delicate. "What is your chief good?" asks Persius. "To have lived always on rich dishes and a skin made delicate by basking in the sun." The *apricatio*, or sunning themselves, referred to by Juvenal was a common practice of old Romans. At Veldes, in Carinthia, Austria, a special sunlight cure has been carried on for some time. The whole body, uncovered, is exposed to the influence of the sun and air for several hours a day, and the patients walk about in the park as lightly clad as in a Turkish bath. It would be difficult to say how much of the beneficial effects of the treatment at Veldes is due to sunlight, how much to pure air, regular habits and a quiet and secluded life; but very beneficial results are obtained in cases of blood poverty and nervous prostration; and the doctors and patients alike believe that in securing these the sunlight is at least an important adjuvant. Sir Lauder Brunton saw at the Roosevelt Hospital at New York a room three sides of which were of glass so that it was flooded with light, and he was informed that this was used as a sun-bath, and that convalescents recovering from illness and operations, who were turned into it and allowed to bask in the

sun's rays, seemed to regain flesh and strength more rapidly than others not so treated. In certain states of exhaustion and reduced nutrition there arises a craving for sunlight, and in the grounds of any asylum in summer time you may see chronic lunatics complacently basking in what would be a distressing and broiling glare to ordinarily constituted persons. "The love of light," said Ruskin, "is more instinctive in the human heart than any other of the desires connected with beauty."

But the surviving direct action of light on the skin generally in man, important as that is and likely as it is to be employed by new methods in new directions, need not withdraw attention from its reflex action through the eye, and that reflex influence has not yet, it seems to me, received the attention it deserves. We are apt to think that the eye is for seeing only and to ignore its subordinate functions, but one of these subordinate functions is, I suggest, the transmuting light into a trophic stimulus to the system as a whole. Light operating through the eye, brain and spinal cord seems to be a universal tonic, promoting healthy nutrition and so increasing resistance to disease. The blind are almost invariably feeble, anæmic and prone to illness. No doubt other concomitants of their affliction are partly responsible for their debility, but the deprivation of trophic influence which their sightlessness involves is, to my thinking, a contributory cause. In the open air treatment of tuberculosis light is a powerful accessory, and it is so, not by any lethal action on the bacilli, which, buried in the lungs, it cannot reach, and which

when expectorated are more expeditiously and efficiently destroyed by other agents, but by its trophic influence on the lungs through the vagi nerves, thereby increasing pulmonary resistance to bacillary invasion. Division of the vagi in an animal is, we know, rapidly followed by pneumonia and gangrene of the lungs, owing to section of the trophic fibres, and it seems probable that any diminution of trophic influence through these nerves will lower the vital resistance of the pulmonary tissues and that a full and free flow of trophic influence will brace them in their struggle with disease. That full, free flow of trophic influence through the vagi to the lungs is, I suggest, greatly reinforced by the copious admission of light to the eye.

Light is instrumental in preserving health and in maintaining it at a high standard, by its immediate effects on the individual man, psychical and trophical, as well as by its action in safeguarding him from microbic attacks. It is therefore a sanitary agent of the first order, and it behoves all good sanitarians to spread the light, to conserve the light and to protect it from pollution.

Fresh air, pure water, good drainage, unadulterated food, spacious dwellings are cardinal sanitary requirements, and bright light must henceforth be added to their number. I say henceforth, for heretofore the claims of light to sanitary consideration have been sadly neglected, and in most civilised countries stealthy encroachments on its domain have been allowed to go on almost unchecked.

In this country, until a very recent date, there were

actually legislative restrictions on the enjoyment of this common necessary of life. The window tax, which was instituted in 1696 and continued in force until 1851, and which for many years yielded two millions to the revenue, was a harassing burden on the householder, for it amounted in some cases to 10s. per window per annum, and was so strictly interpreted by the Courts that skylights, coal shoots and even zinc plates introduced into the wall for ventilation were held to come within its scope. It led on a large scale to the blocking up of existing windows and to the construction of houses with a wholly inadequate light supply. It blighted domestic architecture for a hundred and fifty years; it undermined in some degree the physical vigour of the people, and stamped on them decrepitude from the vestiges of which we are doubtless suffering to this hour. The abolition of the tax, which took place in the year of the first Great Exhibition, and which will ever reflect honour on the memory of Sir Charles Wood, afterwards Lord Halifax, was due not to any awakening to its sanitary iniquity, but to an agitation against the domiciliary and inquisitorial visits of the assessors to private premises.

During the last half century windows have increased and multiplied and expanded their dimensions, and we shall never again, as was the case in Edinburgh during the existence of the tax, see a whole row of houses erected without a single window on the bedroom floor. Still, the effect of the tax was to accustom the people to dingy dwellings, and I question whether we have even yet arrived at a state of fenestral perfection. It is for

practical sanitarians to insist on the big window and the open window and to teach that the light and air that these admit sweeten and disinfect the house and drive away sickness and divers diseases.

But the big window will not be of much avail, unless the light can get at it, and its situation as well as its size is therefore of sanitary moment. It should be so placed that it is not heavily overshadowed and that the sunlight during at least some part of the day can directly fall on it. And here we encounter the great crux in connection with sanitary house-building in our towns and cities. It is impossible to witness without anxiety the piling up process that is going on. In the walled towns of yore the houses grew aloft, acrogenously, story on story, because lateral expansion was impossible within the protected area, and in the industrial towns of to-day economic considerations as rigid as stone walls create enclosures within which accommodation can only be found for the crowds that press into them by packing them tier on tier. A general skyward movement is in progress. Artisan dwellings, warehouses, shops, mills, hotels, mansions, go on adding cubits to their stature, and lengthening and deepening the shadows around them. There are streets in London that are like tunnels, courts like damp cellars, rooms innumerable—even in fashionable quarters—that no glint of sunshine has ever entered. Little wonder that so many of our London children are puny mites, with poor, thin blood and flabby muscles. In dealing with that housing problem which should occupy the foremost place on the slate of every social reformer and on the solution of which his

best attention should be concentrated, it should be steadily borne in mind that every human habitation or block of habitations should be surrounded by "a moat defensive" of light as inviolable as the streak of silver sea that surrounds our island.

It is already obligatory in towns to provide sufficient open space, not only in the rear of every dwelling, but also in front of it and to afford some avenue by which the sunlight may reach it. More than thirty years ago in the Model By-laws of the Local Government Board issued for the guidance of sanitary authorities, it was prescribed that a clear distance of open space of at least 24 feet across, measured to the opposite side of the street if necessary, is to be provided in front of every dwelling house, and also that an open space, belonging exclusively to it, extending laterally throughout the entire width of the building, is to be provided at the rear measuring from a minimum of 10 feet up to 20 feet across, such space according to the height of the building. These requirements, although excellent in their day and generation, need revisal in the light of our more recent sanitary discoveries, and so does the provision that every room intended for the purpose of habitation shall have at least one window, the size of which is to bear a proportion of one-tenth of the floor area of the room and to open at least half its size. We must now demand more window, more open space about dwellings. Ancient lights are not enough. A more generous luminosity becomes the twentieth century.

But again it will be of small avail that we provide

open spaces about our dwellings and enlarge our windows, if at the same time we allow the window of the sky to be blurred and darkened, and that is unhappily what is going on all over this England of ours. This is the age of smoke in which we are living. Our population has increased, our industries have multiplied, our towns have become both condensed and extended, and over every town now, great and small, hangs a canopy of soot and noxious vapours more or less dense, veiling the sun and shutting off much of his benign influence. Nor does the carboniferous canopy rest upon its urban bed alone. It streams away into the surrounding country, defiling it and stifling its vegetation and animal life. The black fog-fiend travels far.

“Last summer,” says Sir William Richmond, “I was staying at Lockinge, near Wantage, in Berkshire. The thermometer registered for four days 93° in the shade—a temperature which most Londoners resent—therefore it is obvious that in such heat they would light as few fires as possible. Lockinge is sixty-four miles from London. Upon the four days above mentioned I walked up to the adjoining downs to breathe fresh air; the wind was then drawing slowly from the south-east and with it there travelled up dense clouds of smoke, which finally obscured the rolling downs, the trees, the copses within a small area from my point of observation, and I watched it for an hour travel past me towards the north. The moment that the thick veil reached me and my environment I smelt that peculiar stuffy odour of London smoke and dirt. A shepherd told me that he and his friends of the hills called that mist ‘London

dirt,' and he said that when it passed over the snow in winter time it left a residuum of black upon it. The smoke travelled from the Nore, gathering in its progress northward all the smoke of London and its environs. It reached Reading, where an addition to it was made by that smoke-laden town, and proceeded upon its course to stop and fall, where I do not know."

Well, many other areas of the country are no better than London and its neighbourhood as regards smoke. Forests of tall chimneys abound, and one factory shaft emits as much smoke as 200 domestic chimneys. We are smothered in the products of combustion all the year round; in winter these swoop down on us in fogs, grim and horrible, and we must go far afield before we can look on a sheep with a white fleece or pick a flower or blade without soiling our fingers. A sable incubus embarrasses our breathing; a hideous scum settles on our skin and clothes; a swart awning offends our vision; a sullen cloud oppresses our spirits, and we quietly tolerate all this, apparently having come to regard it as inevitable and as a penalty inseparable from industrial prosperity. But is it so? Assuredly not. It is certain that this smoke nuisance is to a large extent the offspring of culpable negligence and profligate waste and that it could be enormously abated if not abolished.

The smoke evil will not perhaps be put an end to by incessant prosecutions and cumulative fines. Of course the law must be put in force against flagrant offenders, and examples must be made now and then; but our manufacturers in this country are already heavily handicapped in many ways, especially by foreign com-

petition, and to mulct them in heavy progressive penalties whenever a black flag can be discerned flying from their mastheads might have disastrous consequences. What we have got to do is to convince them that it is economical to avoid smoke-making, that an automatic furnace feeder is cheaper than reckless stoking—that the sulphurous gases, ammoniacal liquors and other products of destructive distillation which are let loose into the atmosphere are valuable assets thrown away, and above all that there are processes and contrivances now available for obtaining mechanical power in a smokeless and thrifty way. It is, I believe, to gas and electricity that we must look for the abatement of smoke. A revolution is in progress in our methods of lighting, of heating and of power production.

It is not merely by attenuating light that smoke is deleterious; it is charged with chemical products that poison our blood, block up the pores of our skin, lacerate our mucous membranes and load our lungs; but the degree in which smoke obscures sunlight may be taken as a rough measure of its heinousness. Let us not then be content until we have got rid of smoke and again enjoy the light, pure and unblemished as it left the sun just eight minutes ago, for if there be any truth in what I have been telling you to-day, it comes to us “with healing on its wings.”

“Let there be light” was the first creative fiat, and “there was light,” and grass and the herb yielding seed after its kind, and living creatures after their kind followed in its train, and what sanitarians have to say to-day is, “Let there be light again” in this thickly

peopled land. Let us once more divide the light from the darkness and permit no nocturnal intrusion between the rising and the setting of the sun. Then will the grass grow green again, the herb flourish after its kind, flowers blossom in our urban gardens, moss and lichens mantle our city walls. Then will the faces of our toiling millions again be burnished with the glow of health, while the pale pestilence that walketh in darkness will slink away abashed. Then too, it may be hoped, the sleeping spirit of beauty amongst us will awake at the touch of the auroral prince—from her long fume-begotten torpor, so that ugliness may depart from our streets and the glories of architecture again adorn them; while the refining influences of art exalt the national life.

A MINOR SCOTTISH POET

IF I could retrace my life and

“ be a boy once more,
Curly headed, sitting, singing
'Midst a thousand flowerets springing,
In the sunny days of yore ”

one of the most kind and lovable of the folk whom I would find around me at that joyous time, would be the author of these lines, Thomas Aird. We lived near him; he was my father's friend. For years I passed sweet sequestered Mountain Hall, an old farmhouse, where he lodged, twice daily on my way to and from school, and there was ever a smile and a bland word to cheer me on my way. He gave me my first introduction to nature-study, for we went bird-nesting together many a time, not to pillage the mossy tenements in order to stock some fusty cabinet, but to learn the ways of the feathered tribe and admire their beauties and contrivances. I think I can see the good man now as he lifted me up amongst the boscage to get a glimpse of the turquoise treasures of the blackbird, or translated to me the melodious notes of the yellow yorlin into “ a little bit of bread and no cheese.” He taught me the names of the trees so lovingly referred to in his poems.

“ Low o'er the burnie bends the drooping birch,
Behold yon oak, the ancient nobleman,
We love the umbrageous elm with crumpled leaf.
Young Spring, the leafy Architect is in the woods
And builds her green device.”

He presented me with an illustrated copy of Goldsmith's *Animated Nature*, which I still possess. He was a Scottish White of Selborne watching with deep-seeing and reverent eye the world around him and finding loveliness and benign intent in every natural object.

Aird was a minor poet, no doubt. His modest nature shrank from even the just meed of praise, and nothing would have been more distasteful to him than any exaggerated appreciation of his work. He was not in the front rank of the poetical hierarchy of his country, but he was a poet and a ripe and good one. He was not a Mont Blanc or Himalaya, cleaving the rarer regions of the air and towering to the stars, but he was, as it were, a fair Eildon Hill—lofty enough for our rapt admiration, glinting in the sunshine, swept by the cloud shadows, a pride and glory to the Borderland.

Although not enthroned with Burns and Scott, nor high pedestalled like his contemporaries Campbell, Wilson and Hogg, he is entitled to a conspicuous niche in the tuneful choir of the Scottish Pantheon. He has left us poems of imagination, of weird and epic grandeur like "The Devil's Dream on Mount Aksbech," which contains passages of apocalyptic magnificence:

"Beyond the north where Ural hills from polar tempests run,
A glow went forth at midnight hour as of unwonted sun;
Upon the north at midnight hour a mighty noise was heard,
As if with all his trampling waves the Ocean was unbarred;
And high a grizzly Terror hung, upstarting from below,
Like fiery arrow shot aloft from some unmeasured bow.

'Twas not the obedient Seraph's form that burns before the Throne,
Whose feathers are the pointed flames that tremble to be gone:

With twists of faded glory mixed, grim shadows wove his wing;
 An aspect like the hurrying storm proclaimed the Infernal King.
 And up he went, from native might, or holy suffrance given,
 As if to strike the starry boss of the high and vaulted heaven.

· · · · ·
 Above them lightnings to and fro ran crossing evermore,
 Till, like a red bewildered map, the skies were scribbled o'er."

In softer moods he has given us poems of description that reveal a love of nature and a penetrating perception of her finer mechanism that Thomson in his "Seasons" has not surpassed:

"But up from innocent sleep, how fresh to meet
 The glistening morn, over the smoking lawn
 Spangled by briery balks, and brambled lanes,
 Where blow the dog-rose and the honeysuckle
 Hangs o'er the heavy hedge its trailing sheaf
 Of stems and leaves, tendrils and clasping rings,
 Cold dews, and bugle blossoms and honey smells
 And wild bees swinging as they murmur there.

· · · · ·
 'Tis now the silent night, the full orb'd moon
 Hangs in the depth of blue; scarce shine the stars
 Drowned in her light, the valleys of the earth
 Are filled and flooded with a silver haze.

· · · · ·
 Starts if the leaves but shiver,
 The leveret all a-quiver;
 Upraised it sniffs; with mobile ears it listens
 Before, behind; its eyeballs, big and large,
 Turn to each leaf that glistens.
 See ho! from out the stirring shade
 Wilder'd it springs—it stops—it scuds across the glade.
 Wild pet! be safe in Freedom's charge."

In his personal retrospects he has left us poems of affection like "My Mother's Grave" that are, as he said of Thom's "Mitherless Bairn," of warp and woof

imperishable, the threads being of pity and love, dyed in the blood of the human heart and woven by genius in her enchanted loom:

“ Oh rise and sit in soft attire !
Wait but to know my soul's desire !
I'd call thee back to earthly days,
To cheer thee in a thousand ways !
Ask but this heart for monument
And mine shall be a large content.”

The bulk of Aird's poems is not great. A small volume of four hundred and fifty pages holds them all, but his prose was highly poetical and his life idyllic. As all who were privileged to walk abroad with him can attest, he spoke poetry every day; he idealised the landscape before him, and touched every common object with the prismatic tints of fancy, and had he had a stenographic familiar to accompany him and take down all he said, we should have had many volumes of felicitous phrases and illuminative gleams of metaphor. He had his limitations, of course. He did not enter the deepest penetralia of the heart. Its inner and most highly decorated chambers remained closed to him, for he was a Scottish bachelor, young and old, and seems never to have known the “ maiden passion for a maid.” “ The softer flame ” but feebly illuminated his pages: there are no truly amorous passages in his writings; his damsels were all vestals, his youths Sir Galahads. While overflowing with geniality he lacked humour, so that his jokes are mere verbal conceits, and more and more as time went on and he became more and more of

the hermit, his references to our terrestrial journey became more sad and funereal. The plot instinct was not in him, for in his longer poems and tales the rescues and coincidences and discoveries are of the most familiar and commonplace description. But take him all in all he was a true poet whose numbers we would not willingly let die.

Carlyle said he found everywhere in Aird's poetry "a healthy breath as of mountain breezes—a native manliness, veracity and geniality which is withal so rare just now as to be doubly and trebly precious." Of the *Old Scottish Bachelor* he said "We have gone over him in his Scottish village and find him a capital fellow of his sort. The descriptions of the weather, and rural affairs, physiognomies of nature on earth and sky seem to me excellent. More of the like when you please!"

It was in a small house in the parish of Bowden in Roxburghshire, not far from Dryburgh and Melrose that Aird was born in 1802 in August, when the autumn fields were mellowing for the harvest. There first the cradle song stirred his sense of melody. He was of good Border stock, descended from a line of portioners hard-working, industrious, upright and long-lived—his father and mother both reached their eighty-sixth year—and he had the advantage of the most wholesome upbringing. His mother fond and watchful, and dominated by unsophisticated and insistent piety, had yet some literary proclivities, for although strongly convinced of the evils of novel reading, she could not stop when once embarked on *Thaddeus of Warsaw*, and his father,

energetic and provident and bent on seeing his nine children well placed in the world, was not without his lighter side and sang at the fireside fragments of old Scotch songs when the lessons were over. Under such government, the home was a well-ordered and a happy one, notwithstanding that it was somewhat severely cloistered under anti-burgher principles, for whistling on the Sabbath was regarded as a grievous sin. But the severe and frigid Calvinism of the period must have been tempered in the Aird household, for it did not sour or induce reaction or revolt. In his manhood, Aird, ever gentle and tolerant, wrote of the Sabbath that it is "filled up with hopes most glorious that run over and bless all the other days of the week." "The good man's Sabbaths," he said, "are like oases in the wilderness, beautifully styled by the Arabs 'the footprints of God,' rare spots on the desert, full of green palm trees, with singing birds in the shade and welling waters."

Outside the home, Aird had access to what has been to so many Scotsmen the portal to success, the parish school, in which he laid the foundations of a sound stock of knowledge, although the dominie was only "passing rich" on £30 a year. And he had access, too, to what was perhaps the chief source of his inspiration, the lovely scenery and romantic associations of the countryside. The Roman road, Halidean, the Cross of Bowden, stimulated historic speculation, while the woods he wandered in, the dells he traversed and the feeders of the Tweed in which he angled, supplied him with

pigments which he afterwards blended into many a glowing word-picture. How saturated he was with local feeling may be gathered from a verse in one of the last of his poems:

“ Above the mist, the sun has kissed
 Our Eildons—one yet three,
 The triplet smiles, like glittering isles
 Set in a Silver Sea;
 Break glades of morn; burst hounds and horn,
 Oh, then their woods for me.”

In Aird's boyhood, too, there lingered in these parts some aftermath of feudalism and ancient chivalry. In the distance he could see Flodden Hill, and that cruel spur of the Cheviots must have deeply affected him, for when an old man I have heard him repeat, with the tear in his eye, Jane Elliot of Minto's touching lines:

“ I've heard them liling at the ewe-milking,
 Lasses aliling before dawn o' day,
 But now they are moaning on ilka green loaning
 The Flowers o' the Forest are a' wede away.”

Aird always dwelt lovingly on bits of poetry in which the sound is an echo of the sense, and it was the third line here, “ But now they are moaning on ilka green loaning,” which makes audible in cadence the meaning of the words, the doole of the broken heart that specially appealed to him.

But more potent even than picturesque surroundings and romantic associations must have been the spell thrown over him by the Wizard of the North. He was three years old when “ The Lay of the Last Minstrel ” appeared, five when “ Marmion,” eight

when "The Lady of the Lake" came forth, and we know from his writings how the enchantment of these took possession of him. Indeed, we might almost surmise that if there is such a thing as literary dedication, Aird's came to him from Sir Walter Scott. We all recollect the consecrating look that Burns bestowed on Scott at Dr. Ferguson's house when the clever boy gave the reference to Langhorn's lines that had moved Burns to tears, and it may be that some kindly glance given to Aird by Sir Walter as he passed him in the street in Melrose may have sealed the awe-struck callant to the calling he pursued.

After a short term at a school in Melrose, Aird entered the University of Edinburgh when fourteen years old, and became immersed in the intellectual ferment that was then going on there. He went there with a well-knit frame, strengthened by the athletic games in which he had delighted at school, with a quick, receptive, eager mind and suffused with literary enthusiasm, and he came into intimate communion there with one of the great intellectual forces of his age, Thomas Carlyle, who became his lifelong friend. Like Carlyle, Aird had been predestined by his family to the Ministry—and, like Carlyle, to their great disappointment, he declined to pursue the pathway to the pulpit. His motive, however, in turning aside, after he had attended some theological classes, was not, like that of Carlyle, conscientious scruples and "grave prohibitive doubts," for he remained firm in the faith and a devout son of the kirk throughout his life, and, as was his invariable wont,

read a portion of the Scriptures on the day he died, but he had come to doubt his aptitude for clerical duties, and had been drawn towards literature by his assiduous study of Homer and Spencer and Scott and Coleridge. It was rumoured that even while a student he had written a tragedy, and the fate of the author of *Douglas* must have convinced him that the indulgence of his impelling tastes was not likely to conduce to ecclesiastical preferment.

Aird was too genial and generous for ultra-Calvinism, then still in vogue. A sincerely religious man and a good Christian, he was impatient of any binding yoke, and his æsthetic sensibility rebelled against the ugliness of the Scottish Church services as they then were. "In matters of religion," he wrote, "the faults of the Scotch (want of courtesy and softness, disputatious habits, pride and self-sufficiency) are often carried to an offensive pitch. So determined are they to discard everything like outward ceremonial observances in their worship, and to keep their ground aloof from Popery and Prelacy, that they will hardly allow themselves to be decent in a House of Prayer. Then, the rage of the Scotch for preaching—nothing but preaching! The very days of their Sacraments are called 'preaching days.' They lay far too much stress on the intellectual gratification of hearing clever preaching compared with the far more important Sanctuary duty, namely, prayer and praise."

As regards ritual Aird leant to the Anglican form, which he characterised as:

"A worship fitly framed
Betwixt the sensuous and emotional."

On matters of artistic refinement he was not afraid to speak out. Thus he exclaimed, and there is still point in the reproach, although vastly less than at the time he uttered it:

“Scotland with all thy worth, irreverent thou,
In solemn things irreverent, reverent less
Of beauty, loving not the beautiful.”

It is one of Aird's merits that he did something to win Scotland back to the love of the beautiful, not to lead her home

“To the glory that was Greece,
And the grandeur that was Rome,”

for he was never classical, and even in his Miltonic outbursts there is not a mythological allusion, but to open her eyes to the profusion of unmarketable loveliness that lay in her very lap.

While attending the University of Edinburgh—as students of limited means then did—Aird accepted a vacation tutorship, but it was not like Carlyle's tutorship, one that enlarged his acquaintance with the world and with people of mark, for it was at Crosseleugh in Selkirkshire with the family of Mr. Anderson, a farmer. Aird was assuredly the most untravelled of poets, almost of men. Burns got as far as Newcastle-on-Tyne, but Aird never crossed the Border. He never made the grand tour or, like the young buck lampooned in the “Twa Dogs”:

“Took a whirl
To learn *bon ton* and see the worl'.
There at Vienna or Versailles
To rive his father's old entails,
Or to Madrid to take the route,
To thrum guitars and fecht wi' nowte,”

lines which he used to pronounce as the acme of sarcastic contempt. He was exclusively Scotch, lowland Scotch—the triangulation of his life had its vertices at Bowden, Edinburgh and Dumfries, and beyond that area he scarcely went save to pay an occasional visit to his brother at Dundee. His culture was broad, but his experience was narrow, yet it was intense within its scope, for, as Carlyle said, he was at his best in his “descriptions of weather and of rural physiognomies of nature in earth and sky as seen in Southern Scotland.”

But although Aird did not for his holiday take a travelling tutorship, he probably derived no small benefit from his sojourn at Crosseleugh, for there, like Wordsworth, he luxuriated in the peaceful charm of the green braes of Yarrow, the nursery of Scottish song, and there he was admitted to the friendship of the Ettrick Shepherd, whose gleams and snatches of fairyland he thought ineffable. There was nothing in the language, he said, to be compared with “Kilmeny” in its strange unearthly beauty and blissful innocence and purity.

Back in Edinburgh from his tutorship, Aird plunged into the literary vortex that was then swirling there, and in its gyrations he was brought into touch with its master spirits, Jeffrey, Cockburn, Lockhart, Wilson and De Quincey, while he also came under the sway of Chalmers, that great and eloquent divine. He became the editor of the *Edinburgh Weekly Journal* and a contributor to *Blackwood*. In 1826 appeared his first separate publication, *Mutzoufle*, a tragedy in three acts, crude but forceful and saturnine, reflecting, I think, as did also later *The Tragic Poem of Wold*, the influence of

Schiller, whose *Maid of Orleans* he pronounced "the noblest character in tragedy, a counterpart of Sampson. Just a female Sampson."

In 1827 came Aird's *Religious Characteristics*, a series of searching and thoughtful essays, in many passages recalling Jeremy Taylor, which Wilson made the subject of a highly approbatory review. "This excellent and powerful writer," he wrote, "thinks, feels and speaks for himself without arrogance and without presumption, but with a confidence founded less on the consciousness of great talents, although great talents are his, than on the far nobler consciousness of looking on human nature with an eye whose visual nerve has been strengthened by being constantly kept open in the light of faith and fixed on objects not fluctuating but permanent and eternal."

Up to 1835 Aird toiled on in Edinburgh, supporting himself by teaching and by his pen, but in that year he became the editor of *The Dumfriesshire and Galloway Herald*, a weekly journal professing Conservative principles. He took up his abode in Dumfries, and there he spent the remainder of his days—forty-one years—in tranquillity and faithful service. He was an able editor, staunchly defending Conservative principles in Church and State, and although much of a recluse—not morose or shy, but meditative—an esteemed townsman, taking a keen interest in civic and parochial affairs, and ever ready with a helping hand to the stumbling and the fallen.

On all great literary occasions—as at a Burns Banquet or a Scott Commemoration—he was called to the

front, and in spite of his diffidence responded to the summons as a matter of duty, delighting those who heard him by his curious insight, apt allusions and quaint and racy diction. I was present at a banquet given to him when he retired from office in 1863 and vividly recall him, as he stood at the top of the table, dignified, manly, broad-shouldered, hands clasped behind him, head rugged but well-poised, face beaming with benevolence, while with true nobility of mean and suavity of manner he thanked his friends for their goodness to him and was reminiscent of notable happenings during his sojourn amongst them.

It was in Dumfries that many of Aird's poems, since collected, first appeared in the columns of the *Herald*, and it was in Dumfries that *The Old Scottish Batchelor in the Old Scottish Village*, the most popular of his prose works, took shape. This pleasant book, which one goes back to again and again, throws alluring sidelights on many phases of humble Scottish life and character, amongst fenars, cottars, cobblers, joiners and blacksmiths. But Aird was also appreciative of the virtues of the Scottish country gentleman of his day, and in his poem "Frank Sylvan" has recorded his pastimes, his plantings, his ridings, his huntings, his curlings, his penny-weddings, fairs and kirns, his strawberry and his Christmas feasts, all with hearty appetite, all set in a bowery and enchanting landscape:

" Homeward returning by the upward path,
 Old Sylvan stands and listens.
 Through the meek
 Still day, from far off places comes the long

Smooth level booming of the Channel stones,
 Roar goes a stone; adown some nearer rink
 Right left it strikes, triumphant shouts proclaim
 A last great shot has revolutionized
 The crowded tee. Down in the valley to
 The broom-armed heights, upon the gleaming board,
 Such rural sports beguile the winter's day."

There is no man who has been at a bonspiel who does not realise the truth of that, and there is no man on Tweedside who does not vibrate to the invocation:

" Beautiful dale!
 What time the virgin flavour of the Spring
 Bursts in young lilies, they are first in thee;
 Thine lavish summer lush of luminous green,
 And Autumn's glad upon thy golden crofts."

Aird's scriptural studies are often reflected in his poems as in "Belshazzar's Feast," "The Siege of Jerusalem" and "Nebuchadnezzar," and his natural piety gushes forth in almost every stanza. The "Cottar's Saturday Night" is recalled by "The Holy Cottage" and Goldsmith's "Village Preacher" by "To the Memory of a City Pastor."

But Aird's poetical speciality was ornithology. He chronicled with minute observance every flirt and flutter of the feathered tribe. In his poem "A Summer Day" beginning

" Gray brindled dawn comes up before the sun.
 There's health, there's moral healing in the hour
 So naked clear, so dewy dewy cool,"

and ending

" Day melts into the West, another flake
 Of sweet blue Time into the Eternal Past,"

we have besides glowing pictures of Scottish scenery a series of delicate miniatures of the white-throat, the heron, the cushat, the wren, the robin, the wagtail and the owl, with an appropriate benediction on Bewick. Thus hails he the return of the swallow:

“ The little comer’s coming, the comer o’er the sea,
 The comer of the summer, all the sunny days to be.
 How pleasant through the pleasant sleep thy early twitter heard,
 A swallow by the lattice! glad days be thy reward!
 The silent Power that brings thee back with leading strings of love,
 To haunts where first the summer sun fell on thee from above,
 Shall bind thee more to come aye to the music of our leaves
 And here thy young, where thou hast sprung shall glad thee in
 our eaves.”

Aird had some cunning glamour of his own by which he cajoled the birds, for he had always some little songster at his beck and call. He contributed to the *Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society* “ Notes on Birds,” of which one on “ The Chaffinch ” may be quoted as illustrative of his singular success in ingratiating himself with avian visitants so timid and alert:

“ It is my first business when I step out in the morning to call on Robin, and he comes and sits on my hand and eats his breakfast of oaten cake broken into crumbs. With all his habits of familiarity it is not easy to get Robin to do this. We have also with us at Mountain Hall a hen chaffinch or shilfa whose tameness is even more peculiar than Bob’s. She was bred beside the house in 1863. All last winter, and especially in spring when the natural food of birds gets scanty, she was very

much about the door and ventured often into the lobby. She was gradually brought to take food from the hand, and when she was hatching, and came down to me from her nest eager for supplies, I put the bit of cake in my mouth, and she flew straight to my face and took it. When her young were out she took none of the cake to them in the nest but fed them with the small green caterpillars from the leaves. When the fledglings had got to the garden, however, she followed me assiduously for the cake, hovering about my face till I got it into my mouth and then made off with it for her young ones. I may remark here that the oaten bread is preferred by the birds to every other kind; there is much flint in the oat for the bones and the instinct of the bird may like it accordingly. When her brood was dismissed to take charge of themselves, Tibbie (for such is the name we have given our little friend) continued to be very familiar with the people of the house; and often when I was leaning on the gate, the breadth of a field away from our avenue, she came and sat down on the gate beside me. Once, but only once, she allowed me to touch her with my forefinger. After a proper interval, she dressed up her old nest (not a very common thing) and brought out a second brood in it. About the middle of July Tibbie continued to be much away from us, yet visiting us from time to time. For the cake she seemed no longer to care: I suppose she was getting food in the fields she liked better. I have seen the flock of chaffinches repeatedly in our upper grounds; and have noticed, in accordance with White of

Selborne's observation that the most of them are hens. One day lately when I was by a bit of paling up in one of the fields, I saw Tibbie detach herself from a flock of finches on a high tree, and down she sat on the paling close beside me. I offered her some small crumbs, but she declined; her object was pure friendly recognition. After she had sat a while, and I had bantered her for her faithlessness to the kind old door, she answered with a chirrup and rejoined the sisterhood on the tree."

But there was one bird for which Aird had no liking nor even tolerance, and that was the cock. Like many poets, he suffered from sleeplessness, and that the crowing of cocks had greatly aggravated. The most rousing incident in his career was his conflict with the crowing cocks of Dumfries which were an incessant thorn in his flesh, as were those of Chelsea to Carlyle, and ultimately drove him from the town to his country retreat. His nephew, Mr. Aird Smith, recalled that when his uncle visited him his first duty was to catch all the cocks in the neighbourhood and put them under barrels, so that they would not disturb his uncle's slumbers in the morning.

His persecutor he thus apostrophised:

“ So chanticleer, his yellow legs well spurred,
Leads forth his dames along the strawy ways,
He claps his wings; he strains his clarion throat,
His blood-red comb inflamed with fiercer life,
And crows triumphant; soul-distressing sound,
When in the pent-up city, ill at ease
Your keen and nervous spirit cannot sleep,
Hearing him nightly from some neighbouring Court !

Oft have we wished the gallinacious tribe
Had but one neck, and that were in our hands
To twist and draw; the morrow's sun had risen
Upon a cockless and a henless world.
And yet the fellow there, so bold of blast
To sound the morn, to summon Labour up
Is quite a social power; we'll let him live."

While in Dumfries Aird was not cut off from intercourse with kindred spirits, for the town—as Scottish Provincial towns did in those less migratory days—had several men of rich intellectual ability and learning, and he kept up a correspondence with Carlyle, Wilson, Gilfillan of Dundee, Carruthers of Inverness, Allan Cunningham and Professor Blackie of Edinburgh. To young authors like Sydney Dobell, Alexander Smith and Gerald Massey he gave encouragement and useful if trenchant criticism. Pilgrims, too, came to pay him homage, men like Dean Stanley and Principal Shairp. I have seen him strolling on the green expanse of the Dock Park with Delta (George Moir), the beloved author of *Cassawappy*, his closest friend, who died in his arms, when on a visit to Dumfries, and whose memoir he wrote and poems he edited. Mr. Balfour-Browne has told how in his boyhood he once called on Aird, who asked him if he knew where the Grey Friars Church, in which the Bruce stabbed the Comyn, had stood and volunteered to guide him to the spot. As they walked slowly along the Kirkgate and came to St. Michael's Church, they saw two old men in the roadway before them. They were Thomas Carlyle and his brother, Dr. John. They too walked slowly and meditatively

along, and turning into the narrow street, which used to be the Mill Hole, but had become Burns Street, to memorialise the volcanic genius who lived and died there, they stopped for a while just opposite Burns' house. It was a strange scene illustrative of two eras of Scottish literature. Aird, pointing to the two bent old men said, "They are looking at the shell of the tragedy."

In my own boyish encounters with Aird in Dumfries there was always said something worth remembering. Descanting on the hills round the burgh, he extolled those of Galloway, tumultuous and well-wooded, and then pointing to Criffel, 1,800 feet high, that bounds the Solway to the south, he said, "I cannot altogether approve of Criffel; it is too like the dorsum of a stranded whale, whereas Queensburg in the distant North is æthereal and aspiring."

Some time ago I heard Professor Sir Walter Raleigh propose a variant of the first verse of Longfellow's "Psalm of Life" peculiarly applicable to the poets":

"Lives of great men all remind us,
We may shroud our days in mist,
And departing leave behind us,
Work for the Apologist."

Not so with Aird. His life was unclouded, clear of spot or blemish, translucent, beneficent. No whitewash is wanted. There is no equivocal conduct to explain away. There is not a line of his writings we would wish on ethical grounds to expunge. Independent, unostentatious, a scorner of vanities, capable of righteous indignation, but free from rancour, he lived the gentle

life. His aims were lofty, his spirit pure, and the music he has given us is not that of Silenus, but an echo, however faint and distant, of the harmony that reverberates beyond this veil of things, and "vesture of decay." "Effect," he once said, "dwells in a zone of quiet." And in sweet tranquillity he exerted a truly wholesome influence around him.

As we turn over the pages of his poems, which have gone through five editions, we become conscious of an old-world fragrance of rose leaves and lavender and southernwood, very different from the Burlington Arcade perfumes of to-day.

LIVES O' MEN

THERE is a favourite Scottish song in praise of " Caller Herrin' " which affirms that

" They're bonnie fish and halesome farin', "

and that

" Wives and mithers maist despairin'
Ca' them lives o' men, "

and never has the herring better deserved the commendation thus bestowed on it than during the late war. It came to our rescue during our food shortage and undoubtedly saved the lives of men. Its faithful shoals in some degree compensated for the losses inflicted on us by submarines, and, curiously enough, the presence of these shoals near our shores was indicated by the same sign that gave token of the happy dispatch of a Hun **U**-boat, that is to say, by the appearance on the surface of the water of spots of oil given off by the fish.

In total food value, as measured by calories, or heat-generating power, the herring, fresh or salted, is in proportion to weight easily first amongst fishes. In protein content it holds an honoured place. And as regards fat, it is surpassed only by the salmon, the mackerel, the sprat and the eel. " An average herring, " says Dr. Robert Hutchison, " contains about 15 grammes of edible protein (nearly half an ounce) and from 5 to

10 grammes of fat," and it has been truly remarked by Dr. Smith that the despised bloater offers the largest amount of nutriment, for a given sum, of any kind of animal food. Three salt herrings contain about as much protein as need enter into the dietary of an ordinary working man. Whoever has seen those bands of Aberdeen lasses who come down to Yarmouth and Lowestoft with the herrings during the autumn months must realise that the herring diet on which they largely subsist is capable of producing fine specimens of robust and blooming womanhood.

But it is the fat it contains that makes the herring especially valuable as a food and source of energy. From 75 to 100 grammes of fat daily are necessary to the maintenance of health and efficiency. During the restricted supply of bacon and ham that came with the war, we were in this country in some peril from fat deficiency and we should have been in greater peril still had our herring fishery failed us. In Germany, when the amount of fat available was reduced to about one-fourth of what is requisite, there was a widespread occurrence of dropsical disease, which was promptly relieved by the addition of a liberal ration of fat to the food of those afflicted by it. Here, too, we had our note of warning, for dropsy showed itself in some of our lunatic asylums, which were severely rationed as regards fat, and at the same time our miners complained that while on short commons, as regards butter and bacon, their efficiency as coal producers was diminished.

The value of fat as a source of energy and a protein

saver has been long recognised, but it is only recently that the virtues of certain fats in promoting growth and in preventing disease have been brought to light. These fats contain a substance known as fat-soluble vitamin-*A*, which, although present in very small quantities, plays an important part in nutrition. The absence of this vitamin from the diet is followed by certain deficiency diseases—the chief of which is rickets. Various unhygienic conditions attached to slum life may conduce to rickets, but the lack of vitamin-*A* is undoubtedly an important factor in its production. Animals with a diet from which vitamin-*A* is excluded become rickety, and children fed on foodstuffs in which it is deficient develop the same malady and are cured when the essential vitamin is supplied in abundance. There are also grounds for believing that a deficiency of vitamin-*A* or an allied vitamin may be largely responsible for dental caries, which is now so lamentably prevalent and is introductory to so much ill-health.

Now, the richest known source of fat-soluble vitamin-*A* is cod-liver oil, and cod-liver oil, in conjunction with light and fresh air, may be regarded as a specific in the treatment of rickets. But next to cod-liver oil as a bearer of vitamin-*A* comes the oil of the herring, in which it is contained in high concentration. The ultimate source of this invaluable fat-soluble vitamin-*A* in cod and herrings is in diatoms and the minute floating green plants of the sea, which they consume, directly in their larval stage and afterwards derive benefit from indirectly through the copepods and crustaceans which

have fed on them and on which they feed in their turn. A good plump herring furnishes a supply of oil that is equivalent to about a teaspoonful of cod-liver oil, and the regular consumption of the herring as food may therefore, like cod-liver oil, ward off rickets or cure it, and, while promoting growth, prove remedial in the various kinds of debility in which cod-liver oil has been found so eminently useful. In Lewis and other islands of the Hebrides the people live in what are called "black houses," dark, dingy, dirty hovels without windows or chimneys, shared with domestic animals; models, indeed, of every sanitary disadvantage, and from these hovels the babies are seldom taken out of doors and exposed to sunlight until they can walk. And yet the infant death rate in these islands is exceedingly low, being 40 per 1,000 as compared with 100 in the large towns, while rickets and decayed teeth are practically unknown. It is to the food of the Hebrideans that their vigorous health and happy immunities must be ascribed. That consists of fish—amongst which the herring bulks largely—oatmeal and eggs, the liver of the fish being a favourite delicacy when mixed with oatmeal and milk and cooked in cods' heads. The flesh of the white fish that are eaten contains no vitamin-*A*, but that is supplied copiously by the herring that is thus again busy saving the "lives o' men."

Well, of this vitamin-*A* that has such valuable properties when enshrined in the fat of the herring there is a superabundance in the larder of the deep all round our coasts. We have hitherto drawn upon that larder

sparingly, but it is to be hoped that we shall henceforth resort to it much more freely, and we may do so without any fear of exhausting its contents. Mr. Arthur Michael Samuel, who has written a very learned and interesting history of the herring, calculates that he ate 161 herrings in one form or another, but, being a Norwich man, principally as bloaters, in one year, and that as that has been his average consumption for the last thirty years, he must in that time have disposed of 5000 herrings. But if every man, woman and child in these islands ate annually as many bloaters as Mr. Samuel, that would make no appreciable impression on the shoals of herrings that surround our coasts. A good-sized shoal measures perhaps seven or eight miles in length and three or four miles in breadth, and is not less than twenty feet deep. The herrings in the shoal, although not overcrowded, are in close formation; and roughly estimating that every cubic foot of water contains one fish Professor D'Arcy Thompson concludes that there are 10,000,000,000 in an average shoal. But the shoals are multitudinous and approach our shores on all sides at different seasons. They are at Stornoway in January and February, at the Shetlands in May and June, all along the East Coast from Wick to Yarmouth from July till November, and find their way round to Folkestone and Hastings from November to January. Everywhere their arrival is hailed with rejoicing. In the Isle of Man, Sir Hall Caine tells us, it was the custom for the bishop to hold a service on the shore invoking a blessing on the herring fleet. "Restore and continue to us," he

prayed, "the harvest of the sea," and then "up they came, silver white in the moonlight, a solid block of fish, a luminous patch floating across the line of the nets."

But while pursuing regular seasonal migrations, herring shoals are influenced in their movements by local conditions. The herring is a very intelligent and sensitive fish, keen of sight and smell, and avoids polluted water. The objection of fishermen to the use of waste herrings as manure on land near the shore is founded on the observation that when the drainage from the decaying fish reaches the fishing ground in appreciable volume, the herrings are scared away and may not return for a considerable time. The Dutch long ago prohibited the gutting of herrings at sea lest the offal-contaminated area should be deserted by the survivors, and it is well known that when nets full of captured fish get adrift in a storm, so that the fish die and decay in them, the shoals will shun the water thus polluted for a number of years.

Attention has lately been drawn to a new menace to the herring and other pelagic fishes by the fouling of the waters round our coasts by the heavy oil now used as ship's fuel. Pools of this black oil have been observed at various points along the South Coast, and there can be no doubt that these, if widely distributed, will be not only destructive to birds that come in contact with them, but highly injurious to our inshore fisheries. The oil scum interferes with the aëration of the water, and so prevents the multiplication of the minute diatoms, algæ

and crustaceans which form the principal food supply of many fishes. But the herring would not wait to be starved out. It would, with its acute sense of smell, promptly desert waters haunted by such noxious effluvia. But physical disturbance of the water is, as well as its defilement, resented by the herring. A series of violent thunderstorms has been known to frighten it away from a district. The herring fishing on the coast of Scania is now almost extinct, as the fish, owing to their dislike of the noise and turmoil caused by the traffic in the Sound, have migrated Westward. It remains to be seen how the herrings in the North Sea have been influenced in their movements by the agitation due to fleets and especially to submarines and mines during the war.

The migrations of the herring and the causes determining them are deserving of the closest study, for they have played no insignificant part in European history. The Hanseatic League owed its prosperity to the herrings which drew the Germans from the inland towns to the shores of the Baltic, and it was the exodus of the herring from the Baltic to the North Sea in the beginning of the fifteenth century that transferred that prosperity to the Low Countries. The foundations of Amsterdam, it has been said, were laid on herring bones. "Out of the Dutch fishing-fleet," says Mr. Samuel, "grew the Dutch Mercantile Marine, and this came to be of such importance that in Cromwell's time the Dutch owned 16,000 out of the 20,000 merchant ships sailing the seas." Out of the Dutch Mercantile Marine sprang Cromwell's

Navigation Laws of 1651; out of Cromwell's Navigation Laws grew the British Mercantile Marine, the nursery of the Navy; out of the repeal of the British Navigation Laws in 1849 sprang the German Mercantile Marine, from which grew the Germany Navy and eventually the German submarine.

It is to be hoped that having turned again with more avidity to fish as a food we shall adhere to it and make it a larger part of our diet than we have hitherto done. In 1913 the herring catch for the United Kingdom amounted to over 609,000 tons, valued at four and a half million pounds, but of this catch only 25 per cent. was consumed by the home markets; 75 per cent. being cured and sent to Russia and Germany. During the war, the herring fisheries of Norway, Holland, Iceland and Newfoundland developed enormously, and owing to the profits made we may anticipate their still further expansion. The German market will be reopened, and could the Russian market, which before the war was expanding rapidly, be re-established it would greedily absorb all the herrings we could send to it. Italy, Greece and our Colonies are again making calls on us for herrings, smoked, salted and tinned, but it is the development of the home market that should in the first instance engage our attention. That should be part of our reconstruction policy; we should have a herring propaganda. Our people should be instructed in the food-value of the plebeian herring; improved harbour accommodation should be provided for the herring fleets; and greatly increased facilities be given

for the cheap and rapid distribution of the herring catches from the ports at which they are landed.

There is no fish better entitled to popularity than the herring. It appeals to the palate in many different forms; as fresh herring, salt herring, red herring, pickled herring, baconed herring, bloater and kipper, and in every form it is nutritive and wholesome and offers itself to varied culinary treatment. Of recent years our people have shown an increased ichthyophagous tendency. There has been a remarkable increase in the number of fried-fish shops, especially in our manufacturing towns. Some classes of operatives have discovered for themselves that fried fish is especially adapted to their wants: weavers and others who have to live in a warm, damp atmosphere do not love meat; the appetite is poor and requires stimulating; small savoury dishes are more to their taste and they patronise the fried-fish shops largely. The class of fish heretofore supplied by these shops has been mostly cod, haddock and hake, fried in dripping or cotton-seed oil. In future they should add to their menu the herring in all its preparations and pranked in suitable sauces. Mr. John Burns once expressed a pious wish that every working man could have a kipper as a relish to his tea. There is no reason why he should not have it, and a couple of bloaters to his breakfast too, if our national herring fisheries and trade are properly fostered and protected.

Although we have by no means availed ourselves of it as we ought to have done, we have in this country

been greatly beholden to the herring as a food, and we have also been greatly beholden to it in other ways. It has helped to build up our Empire, for to it we owe no inconsiderable number of the seamen who have enabled us to rule the waves. The originals of our herring-fishing folk probably came from the Frisian coast and settled in the small bays and harbours on our eastern seaboard some three hundred years ago. But mingling with the natives and increasing and multiplying they have produced a noble breed. Men reared in our herring fisheries have at all times recruited our Navy, and the Trawler Reserve proved a valuable auxiliary to our naval forces during the war. We have reason to be proud of them and grateful to them for what they have done and are doing to save "the lives o' men."

SHAKESPEARE IN SCOTLAND

“IT is unlikely,” says Sir Walter Raleigh, “that Shakespeare ever visited Scotland,” but it is not merely that spirit of national aggrandisement that led a countryman of mine to claim Shakespeare as a Scotchman because of his “*abeelities*” that induces me to differ from so far-seeing and acute a critic as Sir Walter Raleigh on that point. There is, I think, a reasonable presumption that Shakespeare found his way to Aberdeen, and I have always been in hopes that Dr. Charles William Wallace, pursuing his researches, would discover that he engaged in some small litigation there, or lodged in some house of which the domestic records still exist. The evidence in support of Shakespeare’s excursion to Aberdeen is of a very different kind from that which has suggested that he perhaps crossed the Channel and so acquired his detailed knowledge of Elsinore and of Italy.

Professor Abel Lefranc, in his determined and meticulous attempt to prove that the plays attributed to Shakespeare were really the work of that cultured courtier, the Earl of Derby, argues that the author of these plays must have travelled and become personally acquainted with Wales, Scotland, Italy and France. This, he says, the Earl of Derby undoubtedly did. This he infers Shakespeare never did. How Shakespeare

became possessed of his knowledge of Wales, France and Italy we need not now consider, but as regards his knowledge of Scotland there is reason to believe that he picked it up at first hand and had as personal an acquaintance with that country as the Earl of Derby.

Sir Walter Raleigh admits that Shakespeare often went with his company of actors on their summer tours in provincial towns. Does he not say in Sonnet cx:

“ Alas! ’tis true I have gone here and there,
And made myself a motley to the view,”

and it is certain that a company of London actors who bore the title of “The King’s Servants,” and had a special letter of recommendation from His Majesty, visited the granite city in 1601, and that the chief of that company was Lawrence Fletcher, who belonged to the company of players in London which included Shakespeare. That Shakespeare and Fletcher were intimately associated in their craft is evidenced by the fact that eighteen months later, in May 1603, immediately after King James had taken possession of the throne, the players acting at the Globe Theatre, “pro Laurentio Fletcher, Guilielmo Shakespeare, et aliis,” were granted a licence for the performances of Lawrence Fletcher, William Shakespeare, Richard Burbage, Augustine Phillips, John Heminge, Henry Condell, Richard Cowley and the rest of their associates.

There are enthusiasts who believe that even Inverness had the honour of receiving a visit from Shakespeare, while on his Northern tour. Mr. Haliwell Phillips, perhaps the most painstaking of all the many biographers

of Shakespeare, who presented his valuable collection of books relating to the poet to the University of Edinburgh, held that belief. Acting on a hint from him a few years before he died, Mr. Alexander Cargill wrote to Mr. MacLeish, then Town Clerk of Perth, which was supposed to have been included in Shakespeare's Scottish itinerary, as to the possibility of there being any records extant in that city which might help to a solution of this interesting problem. He received the following reply: "Kirk Sessions records of Perth show that a company of players was authorised to give performances in 1589. That, however, was before Shakespeare came to Scotland. He was in Aberdeen with Fletcher in 1601." Coming from so accurate an authority as Mr. MacLeish was known to be, this reference to Shakespeare seems of no little importance. Unfortunately, Mr. MacLeish died before Mr. Cargill could ask him to verify his statement, so that whatever evidence he may have had to found it on cannot now be obtained, but it may be accepted as made by him in good faith and in reliance on some sort of evidence. It is significant that Shakespeare did not play in London from March 1601 till January 1602, and there were good reasons for his absenting himself at that time from London, where, as the author of *Richard II*, which was supposed to have been instigated by the Essex Conspirators, and as a member of the Chamberlain's Company which produced it, he was in disgrace. Perhaps, too, Shakespeare might be drawn to Scotland by the hope that he might thus propitiate King James, the

prospective heir to the English throne, who in 1589 had given a very favourable reception to Fletcher's company. It is not likely that he was idle for nine months; and it is permissible to assume that he was with Fletcher in the North making acquaintance with the "blasted heath" and with the mild climate of Forres, where "the heavens' breath smells wooingly." Mrs. Stopes, on different grounds, arrived at the same conclusion as Mr. MacLeish, for she says in her fascinating paper on *Macbeth* it is possible and even probable that Shakespeare visited Scotland early in the seventeenth century—*i.e.*, 1601.

There is no direct proof, I admit, that Shakespeare was in Scotland in 1601, but it is not unlikely that the Royal favour shown by the licence, granted immediately on James's arrival in London, before Shakespeare had written *Macbeth* or had complimented him on his miraculous powers of healing and strange gift of prophecy, was bestowed in remembrance of the Scottish expedition of this very company. That expedition took place when Shakespeare was at his brightest, sweetest, best and most energetic period and most inclined to travel—in the year of the composition of *Twelfth Night* and *As You Like It*—and there is nothing known of his movements or proceedings at that time inconsistent with his having joined it, while various references in his subsequent writings make it probable that he did so. He was undoubtedly with Fletcher's company when it started on its travels, playing with them at Oxford and Cambridge, in *Julius Cæsar*

and *Hamlet*, and it is unlikely that he would desert them for the remainder of their round. In *Macbeth* he exhibits a correct and intimate knowledge of Scotland which could scarcely have been possessed by anyone who had not visited it at that date, one hundred and seventy years before Johnson's tour in the Hebrides. Nay, more, he exhibits in that play, as Mr. Charles Knight has, in his biography, clearly shown, an acquaintance which could surely have been acquired only on the spot, in those days of no newspapers and but scant intercourse of any kind betwixt North and South, with the details of a series of trials for witchcraft which took place in Aberdeen in 1597, four years before his assumed visit, and resulted in the sacrifice to superstition of twenty-two men and women, chiefly the latter, who suffered at the stake. Shakespeare was ever hungry to see and hear, and gathered in, from all sources, from his daily personal intercourse with men and women, from books and broadsheets and talk and tavern tattle, the raw material which he afterwards so deftly fabricated. He almost certainly picked up somewhere a smattering of the evidence given at these trials, and it is a reasonable surmise that he did so amongst the gossips of Aberdeen, with whom, in 1601, they must have been a constant topic of conversation, for he had certainly no access to the original documents, since published by the Spalding Club.

As Mr. Charles Knight has pointed out, all the women in the Aberdeen disclosures—and it is a special feature in this group of cases—were accused of having

laid a heavy wasting disease on those persons against whom they had an ill-will, causing them to suffer fearful pains and to lose strength and "dwine," as the Scotch have it. Well, the hags in *Macbeth* claimed the same dread power:

"He shall live a man forbid:
Weary sev'n-nights, nine times nine,
Shall he dwindle, peak, and pine."

It was alleged of the Aberdeen witches that they had power over the winds, and the same power was claimed by the witches in *Macbeth*:

Second Witch : I'll give thee a wind.
First Witch : Thou art kind.
Third Witch : And I another.
First Witch : I myself have all the other;
And the very ports they blow,
All the quarters that they know.

It was testified at Aberdeen against Janet Wishart that she was found sitting in the green corn at sunrise peeling the blades and prophesying of the harvest and predicting a lean year, and Banquo conjured the witches in *Macbeth*:

"If you can look into the seeds of time,
And say, which grain will grow, and which will not;
Speak then to me."

In the indictment against Margery Mutch at Aberdeen it was set forth that, having a grudge against William Smith, she bewitched his oxen so that they instantly "ran mad, brak the pleuch, ran over the hills, and could never be tane nor apprehendit again," which

recalls the fine passage in *Macbeth* descriptive of the conduct of Duncan's horses at his death, when they

“ Turned wild in nature, broke their stalls, flung out,
Contending 'gainst obedience, as they would make
War on mankind.”

A large company of witches and sorcerers were proven at Aberdeen to have resorted to the Fish Cross on Hallowe'en, and to have there indulged, to the Devil's music drawn from the air, in a dance, recalling the “ antic round ” of Hecate to a sound charmed from the air by the witches in *Macbeth*.

Against Janet Wishart, again, it was given in evidence at Aberdeen that she went by night to the gallows on the Links to cut pieces from the dead culprit there, to be used in her foul incantations, while to boil the witches' cauldron in *Macbeth* there is

“ Grease that's sweaten,
From the murderer's gibbet.”

Mr. Charles Knight believed that traces of the Aberdeen trials, which had made a deep impression on Shakespeare, are to be found beyond the limits of *Macbeth*, and that the handkerchief in *Othello*, given to his mother by an Egyptian charmer, who told her that while she kept it

“ 'Twould make her amiable and subdue her husband
Entirely to her love,”

is but a refined echo of the “ clout ” given by the witch Isobel Straquhan to Ellen Mutrey, at Aberdeen, with the assurance that when she stroked her face with it in

the presence of the man she loved she would win and secure his affection.

Still another of the cantrips ascribed to the witches in *Macbeth*,

“ But in a sieve I'll thither sail,”

seems to have been drawn, if not from the Aberdeen trial, still from a Scottish source, for Stevens quotes an instance of witches going to sea in a sieve from a pamphlet entitled “ News from Scotland; declaring the damnable life of Dr. Fian, who was burned at Edinburgh in Januarie last, 1591,” etc.: “ all they together went by sea, each one in a riddle or sieve.”

It may, of course, be objected to all this that the machinery and properties of witchcraft have been everywhere and always very much the same, but it is to be noted that the coincidences in the practices of the witches at Aberdeen and the witches in *Macbeth* are so close and numerous as to suggest strongly that the one was but the counterpart of the other, and it is also to be noted that the *Macbeth* witches are located by Shakespeare at Forres, which is within sixty miles of the scene of the actual witch tragedy of Aberdeen.

There is, I submit, fair ground for holding that Shakespeare was one of the company of players who sojourned in Aberdeen in 1601, and all Scotchmen must trust that he was so, for the fact, if it could be established, that he had trodden Scottish soil and a Scottish stage would add lustre to the annals of their country. If Shakespeare was at Aberdeen, we may believe that he

was honourably entreated there, for the puritanical hostility to theatricals which afterwards reached so high a pitch in Scotland, which has discredited the country down to recent times and which still lingers in some benighted quarters, had not then developed. It did not reach its acme until after the first age succeeding the Reformation, and in 1574 the General Assembly of the Church of Scotland, while forbidding "Clerk" plays, that is to say, tragedies or comedies founded on the canonical Scriptures, sanctioned profane plays not so founded, provided they were set forth on week-days only, and I suppose plays founded on the Apocrypha would have been tolerated. It is interesting to note that there was at this time an anticipation of the Censorship, which has been such a burning question in our time, vested in Scotland in the Church Courts. In Perth, in June 1589, a company of players applied to the Kirk Session there for licence to represent a play, of which they submitted a copy, and the deliverance was as follows:

The Ministers and Elders give licence to play the play, with conditions that there be no swearing, banning, nor nae scurrility, whilk would be a scandal to our religion, and for an evil example to others. Also that nothing shall be added to what is in the register of the play itself. If anyone who plays shall do in the contrary, he shall be wardit and make his public repentance.

I do not know how our authors and managers to-day would relish the submission of their plays to

the Metropolitan Vestries, but I feel sure that it would be a wholesome discipline for actors guilty of gagging to have to appear in a white sheet at St. Paul's Cathedral and be admonished.

But the point is that, at this time, the acerbity of the clergy towards the children of Thespis was not to the north of the Tweed as keen as it afterwards became, or was held in check by the mirth-loving Monarch and his Court, so that the London acting companies, paying occasional visits to the North, were favourably received, and especially that company of which it is possible that Shakespeare was a member; for on October 22, 1601, the Provost, Bailies and Town Council of Aberdeen conferred the freedom of the borough—the highest mark of honour they had it in their power to bestow—upon a batch of strangers, amongst whom were “Sir Francis Hospital, a French nobleman, and Lawrence Fletcher, Comedian to His Majesty, chief of the histrionic company then performing in the city.” What a proud city Aberdeen would be to-day had it included in its list of new burgesses the name of William Shakespeare!

But whether or not Shakespeare ever visited Scotland in the flesh, he is there expansively in the spirit now. During that doleful period that succeeded the Revolution, when Presbyterianism ran to vinegar—I had almost said to vitriol—and established a grinding tyranny, so that Scotland was, as Spurzheim, quoted by Buckle, justly observed, “the most priest-ridden country in Europe, Spain and Portugal not excepted,” the

theatre was denounced from the pulpit as a seminary of idleness, looseness and sin, and stage plays were regarded, not without justification as regards those of the Restoration period, as an indecent and corrupting kind of literature. But the theatre and stage plays are endowed with obstinate vitality, and are not to be stamped out by rampageous clerics, and so throughout the dark period we find them, in spite of the vigilance of the clergy, cropping up here and there. In 1782, Allan Ramsay, not without grave censure, brought down books of plays from London and lent them out on hire at an easy rate, and in 1733 an Edinburgh company of players performed at the 'Taylors' Hall, in the Cowgate, the *Beggar's Opera*, *Othello*, *Hamlet*, *Macbeth*, *King Lear* and *The Tempest*, and afterwards repeated their performances at Dundee, Montrose and Aberdeen. In March 1729 the *Edinburgh Courant* informs us that "the Scots Company of Comedians, as they call themselves, have all of a sudden eloped without counting with their creditors."

But it was with the Renaissance of Scottish literature with David Hume and Adam Smith, Kames and Home and Robertson and Hutcheson that a more liberal and enlightened spirit arose and that Shakespeare made his formal entry into Scotland and took a hold of the people, which he has been strengthening ever since. He appealed to the Scottish intellect whenever it was freed from the buckram of bigotry and allowed uncrippled movement. I do not believe that there is any part of the kingdom to-day in which Shakespeare's plays

are more popular or better appreciated than in Scotland, or in which phrases and quotations from them mingle more largely in the current conversation of the people.

There is, of course, an indigenous Scottish literature in which Shakespeare has no part. It existed before his time, and it has a vocabulary and an idiom different from his. There have been since the union of the Parliaments, as Sir George Douglas has pointed out, "two streams of literature in Scotland, one purely Scottish and the other Anglo-Scottish—streams flowing side by side, commingling their waters from time to time, but still having distinctive channels of their own." As was inevitable, the purely Scottish stream, in which no trace of Shakespeare is to be seen, has become more and more attenuated as time has gone on, although it feebly trickles still. The railway has extinguished purely Scottish literature. Scotticisms and provincialisms are still to be met with in the speech of all classes in Scotland, but the old Scottish dialect in its quaint expressiveness, as used, for instance, by Miss Stirling Graham in her *Mystifications*, has all but disappeared. Even among the peasantry in the rural districts it is rarely to be heard in its native purity, while in the large towns it exists only in a degraded condition, contaminated by modern slang.

As a medium of expression in serious prose composition the old Scottish tongue is practically extinct and cannot, it is to be feared, be revived. It has been superseded by South-Midland English, the language that Shakespeare

spoke. In the novel it still survives and shows recrudescence from time to time, as in the *Kailyard* outburst, and it still lingers in the poets' corner of country newspapers in verses which are generally reminiscent of Burns, but as a literary vehicle it has steadily lost ground.

But as pure Scottish vernacular literature has declined, Anglo-Scottish literature has increased enormously in volume, and just in proportion as the Southern has prevailed over the Northern element in it has the influence of Shakespeare over it become more manifest.

It was in Burns, who is to Scotchmen heroically all that Shakespeare is to Englishmen, and more, that Scottish poetry, both purely Scottish and Anglo-Scottish, touched its zenith. But Burns's purely Scottish poetry is incomparably superior to his Anglo-Scottish, and it lies altogether outside the Shakespeare zone, while in his Anglo-Scottish only the faintest trace, if any, of Shakespearean influence can be detected. Burns's originality is uncircumscribed by Shakespeare, his style was unaffected by him. He knew a little of Shakespeare, but he had not assimilated him in a literary sense, and he had no skill in blank verse, the metre in which Shakespeare excelled. His acquaintance with Shakespeare began at an early age. One of his school books contained scenes from *Romeo and Juliet*, *Othello* and *Hamlet*, and in 1773, when he was fourteen years old, his former schoolmaster, Murdoch, called at his father's farm, Mount Oliphant, and presented him, as a small parting gift, with an English grammar and a copy of the tragedy of *Titus Andronicus*. By way of passing the

evening, Murdoch began to read the tragedy aloud, and very characteristic was the effect of the reading. His hearers melted into tears at the tale of Lavinia's woes, and in an agony of distress implored him to read no more. Think of that! In how many cottars' or peasants' dwellings in England would the reading of *Titus Andronicus* move the family to tears and an agony of distress?

But although thus early introduced to Shakespeare, Burns cannot be said to have profited by a study of him. He was of another school, had small sympathy with the Elizabethans, and followed different models. He read Pope, Shenstone, Beattie, Goldsmith, Gray with avidity, but had he learned to know Shakespeare better than he did it is doubtful whether the knowledge would have quickened his humour or enriched his fancy. In *Tam O' Shanter*, in which his Scottish and English manner are brilliantly combined, the horrors piled upon the holy table in Alloway's auld haunted kirk recall the ingredients of the witches' cauldron in *Macbeth*, but they do so by affinity of nature and not by community of origin. Burns directly quotes Shakespeare only once, but refers to him several times. He does so in the Prologue written for Mrs. Sutherland and delivered by her in the Dumfries Theatre:

“ Oh! for a Shakespeare or an Otway scene
To paint the lovely, hapless Scottish Queen,”

—an expression of his wish for some worthy dramatic presentation of the story of Mary Stuart, uttered just at the moment when Schiller, who was exactly of his

own age, was beginning his tragedy of that name. And there is another reference to Shakespeare, in a line which is one of those I would gladly see expunged from his works :

“ Here Douglas forms wild Shakespeare into plan ”

—a suggestion that Home, the author of *Douglas*, had bettered the stagecraft of the author of *Antony and Cleopatra*.

In the Scottish poets who have succeeded Burns and have written in the vernacular—most of them being in greater or lesser degree imitators of Burns—no trace of Shakespeare’s influence is to be found, but in those of them who have adopted the literary dialect it frequently asserts itself. Sir Walter Scott was permeated by Shakespeare and is constantly quoting him, and Carlyle paid him homage.

But it is not only in Scotland that Shakespeare has asserted his sway. He is all-pervading, a world-poet, both by the diffusion of his power and the spirit in which he speaks. He has invaded every country where letters are cultivated. Germany, unhappily, has apparently assimilated the wickedness which he has depicted as part of the tragedy of life, but in all other countries the ennobling and refining spirit of his art has prevailed. He has helped, and is helping, to shape the history of the world. Do not his works grapple our colonies to us with hoops stronger than steel? Do they not keep alive and glowing amongst the people of the United States that sense of common

parentage that has been a barrier to strife in all but the remote past, has drawn us together recently and must, it is to be hoped, obviate misunderstandings in the time to come? A true chord was struck by Whittier when he exclaimed:

“ Oh Englishmen! in hope and creed,
In blood and tongue our brothers!
We too are heirs of Runnymede,
And Shakespeare's fame and Cromwell's deed
Are not alone our mother's.
' Thicker than water ' in one rill,
Through centuries of story,
Our Saxon blood has flowed, and still,
We share with you its good and ill,
The shadow and the glory.”

POISONS AND POISONING ¹

WHAT, it may be asked, is understood by the term poison? And the first answer to that question that presents itself is any substance which, when introduced into the body, produces injurious or fatal effects. But, for practical purposes, that definition is much too comprehensive, for certain articles of food and drink, when taken too freely, or in disordered states of the system, or by persons of peculiar idiosyncrasies, may prove injurious to health, and even kill, while all the drugs in common use, if given in excessive doses, may cause symptoms of poisoning and death. The question of quantity enters into our conception of a poison which may be described as a substance that, in small amount and by chemical action, has hurtful or lethal effects on the animal economy. This description cannot pretend to strict accuracy, for some poisons perhaps act mechanically, as, for instance, certain microbes which block up the blood-vessels, and ground glass, which, in some parts of the world, has been used as a slow irritant poison. But the vast majority of poisons destroy the living tissues by means of chemical action. Even thus restricted, however, the word poison covers a multitude of agents, for on every shelf in the druggists'

¹ Address delivered to the Pharmaceutical Society of Great Britain, October 3, 1898.

shop stand chemical assassins, capable in small bulk of undermining health or taking life, and, indeed, so numerous are the drugs that must be scientifically regarded as poisons that it has been said that to select and schedule a few of them, which may not be sold without reservations, while the rest are left unguarded, is like prohibiting the carrying of knives while allowing stilettos. In 1857 a woman named Catherine Dickson was executed for a series of murders by colchicum, a then common remedy for gout. But although, as is well known, there remain outside Schedule A, the official poison catalogue, many drugs as mortal as those included in it, and more difficult of detection, and although with the advance of science the field from which the poisoner may cull his simples is ever widening and becoming more variegated in its crop, it must still be maintained that Schedule A has done great public service. It may be logically indefensible, but it is practically useful. Not long ago we had an illustration in the St. Neot's case of the way in which a faithful observance of the regulations connected with it may bring a criminal to justice, for it is certain, I think, that Horsford would have escaped conviction had Mr. Payne failed in keeping an accurate record of the sale of strychnine to him. As a matter of fact, the poisons enumerated in Schedule A are those which have been and are almost invariably employed for felonious purposes.

In looking into the history of poisoning—I am speaking now of homicidal poisoning—nothing strikes one

more than the way in which this kind of history repeats itself from generation to generation. The same old implements are used again and again. There is an absence of anything like originality or ingenuity in the choice of ways and means. Servile clumsy imitation is the rule—fashion reigns supreme. Little or no advantage has been taken of the discoveries of science. No doubt we hear about the subtleties and mysteries of slow and secret poisoning in bygone times. We are told that Henry VI was killed by a pair of poisoned gloves, and that victims were in those days simply and expeditiously got rid of by causing them to smell a poisoned rose, or to wear a tainted ring, but such stories are on a level with those which we now sometimes read in the newspapers of the instantaneous production of insensibility by holding a chloroformed handkerchief to the nose. They are incredible. We cannot believe that in pre-scientific days unscientific persons were in possession of powerful agents of which modern science knows nothing. And when we investigate such cases of secret poisoning in these days as we have any account of, we find, as I have said, that there was nothing occult or wonderful in the process, and that in nine cases out of ten it was some preparation of arsenic that was employed. It was arsenic that was used by Wonderton in 1384 in his attempt to poison King Charles the Sixth of France, and the Dukes of Valois, Berri, Burgundy and Bourbon. It was arsenic that was the active constituent in La Sarpa's wonderful elixir, that played such havoc in Rome in the seven-

teenth century. It was arsenic that formed the basis of the acquetta or manna of St. Nicola of Bari and of Toffania of Naples, which caused the death of six hundred persons; and it was arsenic which was the leading ingredient in the succession powders of Sainte-Croix, which were used by the Marquise de Brinvilliers, and with which she removed her father, two brothers, a sister and several other persons. It was arsenic that was no doubt mainly instrumental in carrying off Sir Thomas Overbury in the Tower, although in his case it was combined with cantharides, lunar caustic and spiders, the *coup de grâce* being given by corrosive sublimate. Wherever we turn, in mediæval toxicology, or that of the Renaissance, it is arsenic, arsenic, arsenic which was the mainstay, not merely of the murderous fortune-telling hag, but also of homicides of commanding intellect and power, like the Borgias and Catherine de Medici.

Of course in those days, and well up to the early part of the nineteenth century, it was impossible to distinguish arsenic with any certainty in the bodies of persons who had died of it, while only the vaguest notions prevailed as to the pathological effects caused by it in the viscera, so that it could be used as poison with considerable impunity. But after Orfila, Reinsch, Marsh, and others carried out their researches, it became of all poisons the most easily recognised by physical and chemical tests, while its symptoms and morbid anatomy are now familiarly known to the whole medical profession. And yet, notwithstanding this, it is still, no

doubt owing to the facility with which it may be procured and its old-established reputation, a favourite with the homicide. Mrs. Cotton, who was executed at Durham in 1873, was arraigned on four separate charges of poisoning by arsenic. Mrs. Maybrick was accused of having administered it to her husband in 1886. Mrs. Sherman, of New Haven, United States, was proved at her trial in 1885 to have disposed of three husbands and some seven or eight children and step-children by means of it, while in the same year Mrs. Robinson, of Somerville, Massachusetts, was shown to have been indebted to it for the disappearance of six members of her family.

I am sorry to have to say so, but it is true that women and doctors are the classes which have supplied the most numerous and notorious poisoners. Man—in this connection minus medical men—bold and militant, is disposed to crimes of violence; woman, weak and timid, when she stoops to crime, inclines to craft and cunning; and hence she has often sought, by the arrow that flieth in darkness, to remove a rival, resent infidelity, avenge her wrongs, hide her shame, or gratify her cupidity. At certain periods poisoning by women has been epidemic, and has anticipated the decrees of our modern divorce court. About the middle of the seventeenth century it was observed that young widows were extraordinarily abundant in Rome, and that most of the unhappy marriages were speedily dissolved by the illness and death of the husband; and inquiries set on foot by the Catholic clergy, who felt bound to make

representations to Pope Alexander VII, resulted in the discovery of a secret society of young matrons, who met at the house of a reputed sorceress for technical instruction in toxicology and mutual improvement in marital dissolution. A little later a similar organisation was brought to light in Paris, again by the action of the clergy, and here it was shown that under the guidance of two nominal midwives, La Voisin and La Vigoroux, large numbers of married women had hastened the decease of their husbands. It was not until upwards of a hundred culprits of this description had died at the stake or on the gallows that this epidemic was stamped out. In Hungary, in the latter half of the seventeenth century, and again only a few years ago, extraordinary disclosures were made as to wholesale husband poisoning by women of the peasant class who, like the Roman and Parisian matrons, employed arsenic to compass their ends.

We can understand in some measure the partiality of female poisoners, acting individually or in numbers, for arsenic, and their rigorous adherence to ancient methods, by remembering that arsenic has been long employed in many countries as the most popular domestic exterminator of vermin, and has also been extensively recognised as an article of the toilette, so that they have been able to obtain it and explain their possession of it on these pretexts, but it is difficult to comprehend why poisoners of the other group alluded to, medical men, should have displayed such poverty of resource as is manifest in their published misdeeds,

and should have confined themselves so strictly to the contents of Schedule A. One would have thought that medical men, with their knowledge of drugs and command over them, would have been able to ring the changes in an infinite variety of ways, to employ alkaloidal and other organic poisons in such a manner and in such combinations as to perplex the clinical observer, baffle the pathologist, and set at nought the skill of the analyst. But not so. With what might almost be called infatuation they have all but invariably worked in the old grooves and carefully prepared a net for their own ensnarement. For the most part they have trusted to the inorganic poisons, which, owing to their unalterable character, and definiteness of reaction, can be identified in the body with mathematical certainty, and when an alkaloid has been essayed it has mostly been strychnine, which, of all the alkaloids, in unalterability and definiteness of reaction, approaches most closely to the inorganic poisons, and to which, too, very conclusive physiological tests can be applied. The rarer and more fugacious alkaloids, which, when detected, it would be impossible to affirm might not be putrefactive products—ptomaines, albuminoses and peptones, resulting from the decomposition of the tissues, or of ingested food, have, as far as we know, never been tried, and even nicotine, the most widely-diffused of alkaloids, with which, I suppose, one-half of the population is always poisoned, more or less, has not, as far as is known, been resorted to with premeditated malice, except in one case, that of the Count Bocarme, who

poisoned with it, in five minutes, his wife's brother Fougnes, although in the body of a murdered smoker it might well pass as a relic of the inordinate pipe or cigarette. I cannot recall a case in which a medical poisoner has gone beyond Schedule A. Palmer used strychnine, Smethurst antimony, Pritchard antimony, Cross arsenic, Lamson aconite, Chantrelle, who although not a doctor was a chemist, morphia, and Tawell, who was a chemist and druggist, hydrocyanic acid. Such are the ignorance, stupidity and rashness revealed in a review of the trials of these medical poisoners that one is forced to conclude that they were, like the miscreants who carry on illicit lines of practice at the present day, medical men only in name, professional pariahs and failures, and that in them, as in the criminal classes generally, intellectual incapacity was associated with moral debasement. Not one instance have we amongst them of average ability, to say nothing of originality or genius, in their nefarious transactions.

True, it may be said that the medical poisoners who have been brought to justice have been the clumsy and incompetent members of their class. The bunglers, it may be argued, have been caught, while the adepts have escaped suspicion. It is, I fear, correct that there have been and are cases of undetected poisoning. Dr. Taylor, the most eminent authority on toxicology of the nineteenth century, said that in his opinion many deaths were registered as from natural causes which were really due to poisoning. In almost every instance in which a medical poisoner has been convicted there

have been good grounds for believing that he had had other victims besides the one whose death was brought home to him, and medical men in large practice have told me that in their professional experience they have come upon cases in which they have had grave misgivings that poisoning was being or had been attempted. It may be that medical men have availed themselves of the discoveries of modern science for wicked and unlawful ends, and have lived on in the odour of professional sanctity unsuspected; but there is some consolation in the reflection that the more scientific a man is the less likely is he to stoop to any abuse of power that science puts in his hands, and that the improved education of the medical profession renders its members more expert than they have hitherto been in the recognition of the symptoms of poisoning of every kind.

But here I must point out that, as regards the future of toxicology, some serious considerations arise, for numerous new poisons are being yearly added to our list, and many of these it is, and must always be, exceedingly difficult to track and identify. Henceforth, the medical man or scientific expert desiring to remove any human stumbling-block in his way, if able to shake off old traditions, may not select his weapon from Schedule A, but from the recently discovered chemical compounds or organic poisons, many of which may be used with comparative impunity as regards detection. In certain cases death from an overdose of one of our new hypnotics might awaken no suspicion.

We have of late years been enlarging our views as to the part played by poisons in the causation of disease and have remodelled our pathology on a toxæmic basis. We know now that the human body, even in its normal state, is a cupboard of poisons, harmless as long as they remain shut up in their own box, bottle, vessel, wrapper or cover, but capable when let loose of inducing disastrous and even fatal consequences to their individual owner or to his neighbours, for human beings in too close aggregation poison each other. Many of the ordinary constituents of the blood and tissues, such as carbonic acid and potash salts, are poisons under certain conditions, and many of the ingredients of the secretions of glands and of the products of assimilation are toxic in their effects, and set up morbid states, such a cholæmia, uræmia, diabetic coma and stercoræmia, when introduced into the general circulation. And not only is the human body packed with home-made poisons, but it is being constantly plied with poisons from without. The soil it dwells on, the air it breathes, the water it drinks, the food it eats teem with micro-organisms, some of which are poison-mongers of a virulent type that quickly avail themselves of any lodgment given them in the body under favourable conditions to carry on their vicious practices. It has been demonstrated that a large number of the diseases that figure most largely in our bills of mortality are due to the action of poisons of complex composition—some alkaloids, some modified proteids, some of unknown structure manufactured in the protoplasm of microbes of such

infinite minuteness that hundreds of millions of them may be present in a single grain of matter, and that find their way into the body from without. As regards these pathogenic or disease-causing microbes, it is now practicable to cultivate many of them in suitable artificial media outside the body, to reproduce the cultivations for many generations, each capable of causing all the symptoms of the original malady when inoculated into animals, and to separate from them the toxins to which their effects are due. The true upas tree turns out to be a microscopic fungus.

Pathogenic microbes and their toxins when introduced into the organism, either by accident or design, set up, not like old-fashioned poisons, organic or inorganic, a group of symptoms distinctive and unique, easily recognisable and not attributable to natural causes, but a disease to which anyone is liable, which may be prevalent in the neighbourhood at the time, and which may be contracted in a variety of ways. Further, these pathogenic microbes and their toxins, when they have proved fatal, leave behind them either no definite traces or only the usual *post-mortem* appearances of a disease, and not, as in the case of the old-fashioned poisons, distinctive lesions and substances capable of chemical or physiological identification that could have no legitimate business in the body unless taken as medicine.

It is possible, then, that the medical and scientific poisoner of the future might resort to the pathogenic microbes and their toxins and induce a disease which

it would be impossible to say might not have been contracted in the usual way. As our knowledge of the life-history and habits of these microbes extends and our skill in manipulating them increases, the number of them available for felonious purposes will become considerable; but even now there are not a few that might be employed with homicidal intent. Of those microbes that have hitherto been cultivated outside the body, and that when introduced into human beings, not immune, either naturally or by previous attacks, in *propria persona* or in their toxic products, produce a specific disease, the tubercle bacillus, would be too slow and uncertain in their actions for homicidal purposes, and that of anthrax, easily recognised, would inevitably awaken suspicion if employed upon anyone not a wool-sorter or engaged in the slaughter of animals or handling of hair. But it is not inconceivable that the bacilli of some other maladies might be made to find their way into the system feloniously by the digestive canal and thus set up their destructive operations. In a romance recently published in a popular magazine the interest hinges on a murder thus bacteriologically effected and minutely detailed. A little disorder of the stomach having been first induced by some indiscretion in diet, the organism reared in a test-tube might be administered in some drink so as to cause certain diseases.

The risk, from the poisoner's point of view, that pathogenic microbes, surreptitiously conveyed into the body, might not prove fatal, but induce an attack of disease ending in recovery, may yet be obviated by

the improvement of our cultural methods. Such microbes are exceedingly susceptible to the influence of external conditions and diet, and by a slight change of temperature or the addition of a minute quantity of a chemical substance to the fluid in which they are grown, or by associating them with other depraved bacilli, those of them that are comparatively benign may be raised to a high degree of virulence. The connoisseur in poisoning of the future might, therefore, having caught his microbe, nourish and train it into intense malignancy and ferocity, and make sure of its doing its deadly work.

But the connoisseur in microbic poisoning is still in the remote future and the safeguards against his machinations are considerable. Only an expert—a skilled expert with a laboratory at his command—could produce the poison. Special difficulty must attend its administration, and the utmost uncertainty must attend its use, for the proposed victim may be immune, or may, as has been said, make a good recovery from the disease induced even by a virulent culture.

I have been speaking of the possible use of disease-causing bacilli for homicidal purposes, but the toxins derived from them are still more readily capable of being put to the same vile use. By the cultivation of certain specific microbes in special media powerful toxins have been produced which in very small quantities may cause fatal results in a very short time, with symptoms difficult to differentiate and refer back to their source. The toxins of several diseases have thus

been separated, can be preserved for a longer or shorter period, and administered to animals with lethal effects. Dr. Sims Woodhead has come across cases in which erysipelas and anthrax have been set up by the inoculation of the infective material carried by flies, gnats, and bugs, and his observation is one of great importance in its medico-legal aspect, and well justifies our insecticidal instincts, for it is clear that an army of toxiferous fleas, flies, or bugs manœuvring at large might do enormous damage.

The poisonous energy of some of these microbic toxins which I have mentioned is extraordinary, and far exceeds anything for which our knowledge of even the most potent of the old vegetable alkaloids has prepared us. Two-tenths of a milligramme of tuberculin injected into the human body, sixty trillion times its weight, raises the temperature of its whole mass several degrees, and one milligramme of tetanus toxin will kill a horse, or six hundred million times its own weight of living tissue. In order to cause death it is necessary to inject only one five-hundredth part as much tetanine as atropine and one hundred and thirtieth part as against strychnine. It is therefore obvious that we have, in these microbic toxins, poisons of great energy, that by the very minuteness of the doses by which they demolish animal life lend themselves specially to criminal designs in the hands of those who are acquainted with their properties and are capable of preparing them.

But in addition to the pathogenic bacteria properly

so called to which, with their toxins, I have been referring, there are others which, although they do not induce diseases known to our nosologies, yet fabricate strong toxins which, when administered to animals, cause rapid poisoning, and which presumably would have the same effect if administered to human beings. Some of the common saprophytes and vibrios are known to produce toxins, and "theoretically," says Professor Klein, "there is no reason why some specialist should not discover methods and media by and in which these and other saprophytes might create powerful toxins which, even in small doses, would cause an acute fatal result."

Not long ago eight cases of serious illness and two deaths occurred at Surbiton from ptomaine poisoning, as it is called, caused by a joint of lamb which was not itself offensive or unpalatable, but had stood near a tongue that was putrid and maggoty. "The poisons found in tinned meats, sardines, hams, veal pies, etc.—ptomaines, alkaloids, and toxins—may be derived," says Professor Crookshank, "from the action of putrefactive bacteria, or of specific bacteria, as, for example, in the meat of animals that have died of anthrax, and may be extracted from the suspected food and tested by administration to animals."

It is clear, I think, that the science of toxicology is becoming infinitely more complex and intricate than it has hitherto been, and that very difficult and curious problems are not unlikely to arise in connection with it in its relation to medical jurisprudence, problems

that may puzzle the discernment of even a twentieth-century Sherlock Holmes. "Chemists," exclaimed Count Fosco with an eye on their toxicological attainments, "chemists—I assert it emphatically—might sway if they pleased the destinies of humanity On my sacred word of honour, it is lucky for society that modern chemists are by incomprehensible good fortune the most harmless of mankind. The mass are worthy fathers of families, who keep shops. The few are philosophers, besotted with admiration for the sound of their own lecturing, voices, visionaries who waste their lives on fantastic impossibilities, or quacks whose ambition soars no higher than our corns. Thus society escapes, and the illimitable power of chemistry remains the slave of the most superficial and the most insignificant ends." But if Count Fosco, speaking before the days of poison gas, thus estimated the empire of chemistry and the boundless power which it places in the grasp of its votaries, what would he not have said of bacteriology and of the hidden and thaumaturgic control over their fellow-men which those initiated into its mysteries possess? Into what rhapsodies would he not have risen over these microbic poisons of superlative virulence and subtlety to which we have now attained, the very existence of which may suggest that it is superfluous any longer to surround with special safeguards the sale of such comparatively harmless substances as are contained in Schedule A? But in entertaining any such suggestion we should be in error, for whatever the future—the remote future—may bring

forth, it is certain that for a long time to come a large majority of poisoners will cling to old methods and stake their necks on arsenic, antimony, and strychnine. For one bacteriological Mephistopheles who can possess himself of a microbic poison, and use it dexterously, there will be at least a dozen poisoners who will take what comes to hand most readily in common life and blunder with it egregiously. And beyond all this, we must remember that Schedule A is not solely intended for the prevention of murder, but is meant to act as a check on suicide, and to avert, as far as may be, deaths due to carelessness and accident. Those bent on self-destruction are not likely, unless to cheat an insurance company, to attempt to induce a lingering illness, or to seek out an inaccessible and inscrutable toxin, but are certain to prefer "such soon speeding gear as will despatch them straight," and the obstacles which this Schedule enables us to put in their way must often frustrate their object or afford them that brief interval for reflection in which the suicidal impulse, when it has reached a crisis, often suddenly dies out. And independently of this Schedule, chemists are, I believe, not rarely instrumental in preventing miserable beings from shuffling "off this mortal coil," for some of them have acquired a quick eye for a would-be suicide, and, as in instances which have fallen within my own knowledge, by refusing altogether to supply him with the poison asked for, or by substituting for it an innocuous fluid or powder not unlike it in appearance, have given him pause and so saved his life. Then, as regards

accidental poisoning, which has become more frequent in recent years, as the demands of our advancing civilisation have become more complex and various, there can be no doubt that the provisions of the Pharmacy Act, when rigidly observed, tend to limit it, and that they will be still more efficacious in this direction when the recommendation which the Pharmaceutical Society has repeatedly pressed upon the Privy Council that they should include in the Schedule carbolic acid, and analogous disinfectants to which so many deaths are now attributable, has been adopted.

The sale of poisons hitherto has been confined to chemists and druggists, who have been trained to caution in dealing with dangerous commodities, and who have proved their fitness for such work by passing a stringent examination; and the wise policy would seem to be to entrust to them the sale of other poisonous substances that have come into vogue and in regard to which the public require protection. No regulations, however carefully worded, can make up for the want of knowledge and a sense of personal responsibility; and free trade in poison is not to be desired any more than free trade in alcohol. Labelling alone is not a sufficient safeguard, and indeed it may be argued that whenever it becomes very general in its use it will in great measure cease to be protective, for familiarity breeds contempt, and the warning word "Poison" is apt to lose its effect when it is incessantly cropping up. The fact that a particular substance has to be procured at a druggist's shop with certain formalities is much

more likely to create caution in its storage and use than the most glaring superscription of poison, if it can be purchased at any ordinary dealer's. Of course one would wish to put no unnecessary obstacle in the way of the distribution of carbolic and cresylic acids, which are so largely used as disinfectants, or of the materials sold for the purpose of destroying insects and vermin, which are now acknowledged to play a serious part in the dissemination of disease, but it should always be borne in mind that cleanliness is the best of all disinfectants and vermin destroyers, and that sound sanitation should render the use of chemical antiseptics only occasionally necessary. There can, I think, be no hardship in confining the sale of these chemical antiseptics to properly qualified chemists and druggists; indeed, there would seem to be great danger in permitting them to be retailed under any conditions by grocers, drysalers, oilmen or general dealers in whose shops they would necessarily be mixed up with various other kinds of goods in regard to the vending of which no special care is requisite. Habitual caution has become second nature to the chemist and enters into all his doings, even, I fancy, into the dispensing of the simplest prescription, for anyone who has had to present such a prescription at a chemist's counter must have felt that the transaction was conducted with great circumspection and solemnity, and that he was sometimes regarded almost as an object of suspicion.

I venture to believe that all the advantages sought could be secured by the inclusion of the substances

named in Schedule A of the Pharmacy Act, and I feel strongly that the Council of the Pharmaceutical Society should continue to advise the Privy Council as to the articles to be comprised in that Schedule. The Privy Council must have special technical guidance in such a matter, and I know not where they could obtain more trustworthy guidance than from the chosen representatives of that body of men who have an intimate practical acquaintance with all the difficulties and dangers attending the sale of poisons, and who will not, I am sure, allow their trade interests to stand in the way of the public welfare.

But whether their powers and duties in connection with poisons and poisonous substances are to be extended or curtailed, I have no hesitation in saying that the subject of poisons and poisoning generally must henceforth engage the attention of all Pharmacists to a far larger extent than they have hitherto done, and, indeed, I feel sure that, however reluctant those responsible for the education of chemists and druggists may be to add to the brain burdens, which already press somewhat heavily upon them, they will be compelled to provide some instruction in bacteriology in their schools of pharmacy, so that acquaintance may be made with those micro-organisms which have been shown to be influential in the production of disease, and which are certainly destined to play an important part in its diagnosis, prevention, and cure. I have spoken of the microbial origin of infectious diseases and of the toxins which pathogenic microbes

secrete or produce by their digestive operations, toxins which cannot be chemically defined, but which are in almost every case the efficient cause of the symptoms of the disease, and I would also call your attention to the fact that many of these toxins contain protective or remedial substances bound up with their toxic ingredients. The bane carries its own antidote, and by certain procedures the bane may be abolished while the antidote survives. It has been experimentally proved that animals that have been inoculated with the microbe of certain infectious diseases, and that have survived the illness thus induced, have become refractory to the action of the same microbe subsequently inoculated. It has been also proved that the same power of resistance has been conferred by the injection of the solutions in which pathogenic microbes had been grown, but from which they had been filtered out, so that only their toxins remain. And it has been further proved that the serum of the blood of animals protected by an attack of the disease artificially induced, although itself incapable of setting up the disease, yet communicates to unprotected animals into which it is injected a remarkable power of resisting it, so that large quantities of its toxin may be administered without deleterious effects. Whatever be the origin of antitoxins and anti-venins, whether due to reaction set up in the tissues of the body, to proliferation of white blood-corpuses, or to a breaking up of the toxin, with destruction of its toxic constituents and retention of those that are antitoxic and protective, it

is certain that they possess a power of counteracting the effects of the toxin and venoms with which they correspond more decisive and far-reaching than that of any known antidotes in the case of mineral and vegetable poisons. A dose of a microbic toxin much larger than that which is necessary to produce a fatal issue is administered to an animal; several hours later, when the characteristic symptoms of the disease have clearly displayed themselves, the antitoxin derived from an animal which has suffered from the disease is injected, with the result that the symptoms of the disease vanish and the animal is none the worse. And the same thing occurs in human beings. The progress of a certain infective disease is arrested or modified by the administration of antitoxins drawn from animals that have been subjected artificially to attacks of the disease or have been immunised against it by repeated and graduated injections of its toxins. We all know the brilliant results achieved by Pasteur in the treatment of hydrophobia, during its incubation period, by the injection of emulsions formed from the spinal cords of rabbits that have suffered from the disease. The protective power of inoculation against typhoid fever is clearly established. No one can be ignorant of what has been done in diphtheria, and how thousands of lives have been saved from that rancorous malady by means of the serum of the blood of the horse, immunised by a series of injections of the toxin. The authoritative judgment of a committee of the Clinical Society of London, that has conducted an exhaustive investigation, is that in cases of diphtheria

treated with antitoxin, not only is the mortality notably lessened, but the duration of life in the fatal cases is prolonged, while no prejudicial action beyond transient skin rashes has been shown to follow its use, even in large amounts. Doctors Sidney Martin and Bertram Hunt have demonstrated that in cases of diphtheria observed in University College Hospital, the total mortality in the whole, without distinction of ages or the sites of the local lesions, has fallen from between 33 and 43 per cent. in the years before the antitoxin treatment was inaugurated, to 29 and 17 per cent. in the three years during which antitoxin has been used, and that in tracheotomy cases the mortality has been reduced from 65.5 to 26.4 per cent. The poison of tetanus may be overtaken by its antitoxin and prevented in many cases from killing, as it would otherwise do. Excellent results are reported from Naples obtained from anti-pneumonic serum in a recent epidemic of pneumonia there! Observations are accumulating tending to establish the utility of antistreptococcus serum in septicæmia. Experiments performed at Monte Video by Sanarelli indicate that the serum of the blood of the horse vaccinated with the *Bacillus icteroides*, in doses of gradually increasing intensity during twelve months, greatly diminishes the mortality and mitigates the severity of yellow fever. The poison of venomous snakes is counteracted by antivenin, and it may be reasonably expected that this remedy, which we owe to the admirably devised experiments of Fraser and Calmette, will yet enable us to cope successfully with the

effects of the bites of venomous serpents which in many countries cause widespread havoc.

Step by step, armed with our antitoxins and our serums and our lymphs, we are encroaching on the ghoulish regions of disease and bringing hope and healing where before all was darkness and despair. There is no extravagance in the prediction that all the infective diseases will ultimately be brought under control more or less and have their power of evil vastly restricted if not abolished. And that means more than might at first sight appear—vast although even then is the prospect of benefit to mankind—for diseases hitherto not regarded as infective are being brought into that category or shown to be of toxic causation, and, therefore, amenable to our new methods of treatment. Should it prove, as Nissl and McLane Hamilton have alleged, that a considerable number of cases of mental disease are due to auto-intoxication, or parasitic invasion, then antitoxins may be instrumental in checking the increase of insanity that is going on amongst us, and that statistical ingenuity can no longer explain away. Should Dr. Westura Sambon be correct in maintaining that sunstroke is an infective disease we shall shortly be combating insolation by an antisiriasic serum. If Dr. Buzzard is right in arguing that anterior polio-myelitis is due to a bacterium, we shall yet teach that bacterium to circumvent itself and leave little limbs unwithered. It is within the bounds of possibility that by means of an antitoxin or serum we may yet restrain the course of cancer, that “perilous stuff which

weighs upon the heart” of the present generation, for we may discover and circumvent some still invisible germ that induces it and promotes the egregious over cell growth in which it consists. And this brings me to a consideration in connection with antitoxins which should not be omitted in any survey of their therapeutic powers, and that is that in some instances, besides saving life, they mitigate the sequelæ which infective diseases so often leave behind them. Given, therefore, to patients who might survive without their aid, they still promote speedy and complete recovery by warding off secondary structural alterations in muscle- and nerve-fibre and in the viscera. We are all aware of the disasters that small-pox leaves in its trail—blindness, deafness and deformity—although happily we see infinitely less of these than our forefathers did and than our children will do, when the faddists are effectually muzzled and effect is given to the conscientious objection of the nation to the conscientious objector. We know something of the kidney disorders and disorganisation of the middle ear that so often follow on scarlet fever, and of the paralysis that dogs the footsteps of diphtheria, but perhaps we scarcely realise that every infective disease leaves its mark upon the system. I have heard the late Sir William Gull say—and most of his sayings were worth remembering—that it takes a man three years to recover perfectly from an attack of typhoid fever, and it is certain that the health and happiness and kinetic energy of the community will be sensibly augmented by the employment of

medicaments that not merely diminish the mortality of a large group of diseases but limit their secondary ravages.

I have touched on the actions and uses of antitoxins and serums in the case of disease (and I can but touch in passing on a subject already very voluminous and expanding daily), and I would next touch even more casually on the still more momentous *rôle* assigned to them in relation to its prevention.

Instances of constitutional insusceptibility to certain poisons in certain animals, such as that of cows to belladonna and pigeons to opium, have been long recognised, and so has the tolerance of poisonous doses of many toxic substances, such as opium and arsenic, established in man and animals by their habitual use. It has been long known that many infectious diseases confer on those who have suffered from them an exemption, more or less lasting, from subsequent attacks, but it is only since Pasteur taught us the "Open Sesame" of fermentation that we have come to understand that a power of resisting certain infectious diseases, analogous to that bestowed by vaccination in the case of small-pox, may be secured by the use of the microbe which causes them, of the fluid in which it has lived or of the blood-serum of an animal in which it has lived and died. An animal thus treated becomes proof against the particular disease, so that as much as fifty times the original minimum lethal dose may be injected without causing inconvenience. The duration of the immunity thus artificially induced has not yet been very precisely

measured in any case, but this seems to be established, that the immunity conferred by a toxin is less than that conferred by the microbe itself, and feasibility is therefore given to Professor Fraser's theory that long-continued immunity depends on the continued existence in the body in an attenuated form of the microbes causing the disease, and on the continual manufacture by them of the antitoxin or immunising substance.

The grand instance of protracted immunity is, of course, small-pox, in which the mild attack brought on by vaccination protects completely for seven years and partially for a much longer period, and in which two such mild attacks give lifelong freedom from the major malady. In cholera prophylactic inoculations have been practised, it is said, with encouraging results, and in other infective diseases experiments of much promise are being carried on, and we are entitled to hope that the microbes of a number of them may yet be so tamed and domesticated as to be changed from ravening wolves into faithful house-dogs, warding off all wolfish attacks. It may be that attenuated microbes of infective diseases do even now occasionally confer immunity upon certain persons spontaneously and by stealth, for, by their unsuspected reception into the body as well as by inherited insusceptibility we might account for the fact that a few individuals set at defiance the virus of certain infective diseases—even when exposed to it in the most intense concentration.

There are infective diseases—influenza, erysipelas, rheumatic fever and others—attacks of which afford no

guarantee against recurrence—nay, in which one attack almost seems to predispose to another by the debility or vicious habit it leaves behind it, but even in these we need not despair of ultimately reaching protection, for their microbes, which cannot apparently within the body be reduced from the toxic to the antitoxic phase of existence, may yet be capable of such conversion under the wider range of altered conditions to which it is easy to subject them during extra-corporeal treatment.

We are entering upon an era of serotherapy and organotherapy. Marvellous advances are in store for us. So rosy is the prospect that it increases one's constitutional disinclination to die. We should all much like to live and see the wonders that are to be revealed hereafter, when the new remedies are perfected. Of course, the new remedies cannot altogether supersede the old ones. They must supplement them and crown the edifice of medical science. When they have come in their fulness and strength, sanitary precautions will still be called for as much as ever to prevent the multiplication and spread of pathogenic microbes, to ensure the purity of light, air and water, to prevent the contamination and adulteration of our food and drink and physic. Hygienic measures will be none the less needful in maintaining a high standard of health, which means effectual resistance to many microbic assailants. Eliminants will be as useful as ever in aiding the expulsion of poisonous products, and sedatives, antipyretics, stimulants, hypnotics, narcotics, tonics, alteratives and

specifics will still retain their value in the alleviation of symptoms and the correction of innumerable morbid aberrations. But beside and beyond those the new remedies will take their place, and unless we are strangely deceived, bring about an enormous diminution of preventable disease and of human suffering.

How far immunisation may go it is as yet impossible to foretell, but giving rein to imagination, we can conceive of a time when sure and permanent protective antitoxins against all the more prevalent infectious diseases having been discovered and generalised, a course of immunisation will be made obligatory upon every child, as elementary education now is. Out of that course of immunisation the child will emerge in this hygienic Utopia, not as after a course of education docile, but refractory in the highest degree, proof for life against small-pox, tuberculosis, scarlet fever, diphtheria, whooping-cough, measles, and all the zymotics that do so easily beset us. In these halcyon days, too, a man going to the tropics will call on his doctor and take out a patent of protection against the dangerous diseases endemic in the region he is about to visit, and thus the West Coast of Africa will be stripped of its terrors and yellow fever will cease to be a bugbear in Brazil.

Professor Fraser holds that antitoxins originate, not from vital reactions, but from chemical changes in the toxins themselves, and prophesies that the time will come when they will be prepared, not by inoculation of animals, but by chemical processes in the laboratory,

and seeing that we can already in the case of some drugs so modify their action by the introduction of a new molecule that they not only lose their original properties but become pharmacologically active in the reverse direction, there would seem to be good ground for his belief and prediction. When that time does come, those antitoxins will assuredly take their place beside other potent and beneficent poisons.

STRUGGLING SCOTTISH STUDENTS

“HE would rise in his garret at four in the morning, even when the snow was a foot thick on the skylight, kindle his lamp by tinder-box and splint of wood dipped in sulphur, and sitting down in the keen cold turn half a page of Addison into something as near Greco-Roman Latin as he could effect. This would take him from an hour and a half to two hours, when he would tumble again into his bed, blue and stiff, till it was time to get up and go to the morning school before breakfast.”

That is a true account of what went on about a hundred years ago in many a humble home in Scotland, in which poor boys, seized by the fever of ambition or inoculated with it by their parents, sacrificed pleasure and comfort, and endured pains and privation in the thirst for learning. In no other part of the world has that fever raged so continuously or assumed such acute forms.

A Scottish gentleman once told me that when walking along a country road in a Northern County one October day, he heard a curious whimpering in a field, and looking over the hedge saw a small boy of about fourteen years of age engaged in digging potatoes. The boy was weeping and murmuring, and presented a somewhat grotesque appearance, as he had been wiping away his tears with his earth-soiled hands.

“What are ye greetin’ for?” the gentleman asked.

“Because faither winna let me gang to college,” was the reply.

The boy had been dux or head of the parish school and had fixed his hopes on what seemed to him the highest felicity, a University career and a victory in the game of intellect and the battle of books. But his father, a small farmer who had pinched his household to put an elder brother in the ministry, did not see his way to another hard struggle with *res augusta domi*, and so sent him to work on the land. *Hinc illæ lacrimæ*.

Touched by the boy’s woe and impressed by his scholastic ardour, the gentleman said to him, “Gie ovr yer greetin’, ye shall gang to college.” Forthwith he visited the father and persuaded him to give the boy a trial, and enabled him to do so by insisting on his acceptance of a small loan which was in later years punctually repaid. So the boy did go to the University, gained a five pound bursary, drudged on diligently for eight years, eking out a scanty living by teaching in the evenings, and obtained his degree. I must not mention his name, for he is still alive and has attained to a position of great eminence in one of the learned professions.

When I was myself a pupil at a Scottish grammar school, many long years ago, there were a number of boys, sons of small farmers, cottars or country clergymen, who walked four or five miles every morning to be at the school at nine o’clock, and who walked home the same distance after it “scaled” at four o’clock sustained only by a frugal luncheon of bread and cheese.

By such boys the spirit of the school was maintained at a high intellectual level. They meant learning and were bound to learn. They were not without a secondary and subordinate interest in football, shinty and even marbles—cricket was at that time unknown in Scotland—but it was things of the mind that chiefly concerned them, and their conversations on their long trudges to and fro, and in the intervals in school hours, was of books and history, heroes and problems. One boy I knew when he got home in the evening had to deliver the milk from the farm, and might be seen in the cuddy cart studying Herodotus in snatches.

There were, of course, idlers and dullards in those days, as there always will be, but the school generally was alert and diligent, in tone very different from the affluent Eton of the same period, where, according to one of its gifted sons, intellectual sluggishness prevailed. "They knew little, they hated books; they regarded Scholars with good-humoured indifference or neglect; they worshipped athletes with an ever-increasing veneration. To mention the Newcastle Scholar of the year would have been to the majority a painful effort of memory. The captains of the boats and the captain of the eleven were deities, ever present to their thoughts."

But it was not only in the schools of Scotland that the path of learning was steep and thorny in the first half and middle of the last century. Hardships had to be encountered at every step. No stage coach or comfortable railway carriage took the poor student to his college destination. He had for the most part to walk or get a lift in a carrier's cart.

George Macdonald, in his radiant novel, *Robert Falconer*, paints from the life a group of half-a-dozen foot-faring students from Aberdeen making their way home through a biting East wind in March, at the close of the winter session, to take up the farm labours of the spring.

“The company,” he says, “was composed of men of lowly origin who either could not afford to travel by the expensive coaches or could find none to accommodate them. Possibly some preferred to walk. The various groups of this kind, who at the beginning and close of each session passed through Rottinden weary and footsore, were sure of a hearty welcome at the Boar’s Head. And much the men needed it. Some of them would have walked one or two hundred miles before completing their journeys. The men knocked at the door and Miss Letty the hostess herself went and opened it.

“‘Can ye tak’s in, mem?’ was on the lips of their spokesman, but Miss Letty had the first word.

“‘Come in, come gentlemen! This is the first o’ ye and ye’re the mair welcome. It’s like seein’ the first o’ the swallows. An’ sic a day ye have had for yer lang traivel.’ She went on leading the way to her sister’s parlour and followed by all the students.

“Miss Napier gave them a similar welcome, shaking hands with every one of them. She knew them all but the last, the most weary and downcast. To him she involuntarily showed a more formal respect, partly from his appearance, and partly that she had never seen him before. Presently she went to order supper.

“ ‘ Now gentlemen,’ said Miss Letty, ‘ wad ony o’ ye like to gang and change yer hose, and pit on a pair o’ slippers? ’ ”

A faithful picture this of the respect paid to learning in Scotland of old days and the journeyings of University students of the cottar class, men who followed the plough in the spring and reaped the harvest in the autumn; and welcomed the winter that opened the door to yet harder toil and poorer fare but gave enlargement of vision and the blessings of culture.

Lord Kelvin, on the occasion of his installation as Chancellor of the University of Glasgow, related how his father, who ultimately became a professor there, attended the classes for four consecutive years while earning his livelihood as an assistant teacher in the North of Ireland during the summer.

“ There were no steamers or railways or motor cars,” said Lord Kelvin. “ Can the young person of the present time imagine life under such conditions? My father and his comrade students, chiefly aspirants to the ministry of the Presbyterian Synod of Ulster and for the medical profession in the North of Ireland, had to cross the Channel twice a year in whatever sailing craft they could find to take them. Once my father was fortunate to get a passage by a Revenue cutter, which took him from Belfast to Greenock in ten hours. Another of the crossings was in an old smack, whose regular duty was to carry lime, not students. The passage took three or four days, in the course of which the little vessel, becalmed, was carried three times round Ailsa Craig by the flow and ebb of the tide.”

But it was after his arrival at the University that the serious troubles of the poor Scottish student of old days began. He had to practise the severest economy, and while pampering his brain with classical and mathematical dainties, had to chasten and sometimes half-starve his body. The food was meagre, the cooking in the lodgings execrable. Much dyspepsia in after life dated from stomachic difficulties coincident with academic successes, and the seeds of more serious maladies were then sometimes sown in the impoverished tissues. Several of the most brilliant men of my time died young from tuberculosis. One I recall of rare promise—the most highly gifted youth I have ever met—who had clambered up to Oxford by bursaries and scholarships, succumbed to that disease, when it was found that he had stinted himself grievously all along to provide for his mother, who was a domestic servant, and perhaps with some premonition of his fate to insure his life in her favour. A glass of mild ale at Rutherford's—"the spider's web round the corner," as a rabid teetotal professor called it, was, I believe, a saving clause in the diet of some underfed students in my days in Edinburgh.

A volume might be filled with stories of noble self-abnegation, of dogged perseverance, of curious adaptations and contrivances by students. A string across a room had to partition off the quarters of two men who were obliged to live together, but were not perhaps on speaking terms. And the arrangements of the commissariat were often similar to those that Oliver Goldsmith found in vogue at the University of Edinburgh

at an earlier date, when he learned to live for a whole week on a single loin of mutton, having a broiled chop the first day, a fried steak the second, a chop with onion sauce the third, and so on till the fleshy parts being all consumed, on the seventh day came a dish of broth made from the bones, and the ingenious landlady rested from her labours.

But Goldsmith was luxurious and extravagant. A hundred years ago many Scottish students rarely partook of animal food. A typical description of the sort of life they led is given in a manuscript lately brought to light, some biographical notes of the late Dr. Thomas Murray, author of the *Literary History of Galloway*.

“On my arrival in Edinburgh,” he writes, “I and my companion took lodgings, consisting of a single bedroom, and the character of the accommodation may be inferred when I mention that the rental was four shillings and sixpence a week, coals included. I joined the Latin and Greek classes and also attended a three-months course of English reading. My attention to my studies was assiduous and my progress proportionate. My whole funds which were to keep me during the session and provide for class fees amounted to sixteen pounds. I economised them well. Butcher’s meat I never tasted. As I could not well afford candles, I often stretched myself on the floor and turned up my dictionary by the light of the fire. Early in March my resources became exhausted and I waited on the two learned professors to ascertain if the time I had attended might be allowed to count for a session. Knowing my circumstances they assented, and I started on my walk

home with three shillings and a few coppers in my pocket."

Sir William Robertson Nicoll when he entered the University of Aberdeen in 1865 had to live on eight shillings a week, but at once embarked on teaching, and in five years, when he took his degree, was earning £100 a year in that way. The father of Sir William Robertson Nicoll went to Aberdeen University with a bursary of £12, and of that £8 went on fees, leaving him £4 on which he had to live for five months. Dr. Carlyle of Inveresk was one of the lucky ones. His father obtained for him from the Duke of Hamilton a bursary for a student in divinity to pass two winters in Glasgow College and a third in some foreign University—the salary for the first two years being £100 Scots, and for the third £400, a hundred pounds Scots in 1742 being equivalent to £8 6s. 8d.

They were intent on work, and sometimes absorbed in it. "The mathemaitics," was the reply proudly given by a rustic student on the platform of a railway station, on his way to the University for the first time, when asked by the stationmaster, "What class, sir, what class?"

In my day in the University of Edinburgh, which has always been the most well-to-do of the Scottish Universities, with fewer poor students than the others, there was not much of extreme impecuniosity, but there was nevertheless plenty of privation and pinching, and many instances of courage and fortitude under grievous trials.

A few affluent students from England and the colonies

lived in clover: the students with homes in Edinburgh—mostly the sons of professional men or well-to-do tradesmen—had nothing to complain of, but the rest of us, even with what were considered liberal allowances, had to put up with food and lodging that an Oxford or Cambridge Undergraduate of to-day would shudder to contemplate.

In my faculty, that of medicine, there was less poverty than in the faculties of arts and theology, but a few medical students had to support themselves by teaching, and others had to depend to a considerable extent on supplies sent from home. I have seen their store boxes and baskets unpacked of their contents, meal and oat cake, butter, eggs and cheese and a few pots of jam.

My old fellow student and fellow graduate—for we were capped on the same day—Colonel Kenneth McLeod, who has done his country signal service in India and was honorary physician to King Edward VII, has recorded his experiences at the University at this period:

“A son of the manse,” he says, “is seldom flush of cash, and a small stipend and a large family are prohibitive of much expenditure on Education. Classes, books, instruments had to be paid for by all alike, but in every possible way I found it necessary to pinch. My account for board and lodging seldom exceeded twelve shillings a week and the whole cost of my medical education was under two hundred and fifty pounds. Towards the end the fountain ran dry, but with the aid of loans and gifts from relatives and friends I managed to scrape through.”

All this is of the past. We have fallen on softer

places in Scotland now. What with the increased wealth and productiveness of the country and the multiplication of bursaries and scholarships there need be no lean students to-day. It may even be questioned whether the Universities, although they are still begging as stoutly as ever, are not already too well off. It is good for institutions as well as for individuals to have, in the words of Agur, the son of Jakeh, "neither poverty nor riches."

Looking back on the days of poverty one sees the good and the evil of it all, the incentive to work that the *res angusta* gave, the injury to health that they sometimes inflicted. It was a splendid discipline but a perilous ordeal. Character was formed, but the constitution was sometimes shaken. The mind was strengthened, but enjoyment was sacrificed when it has a far-reaching tonic effect. Many men dropped out by the way, and others left the University with distinction, but with damaged health. "Neither poverty nor riches"—that is, after all, the *summum bonum* in a University career.

THOMAS YOUNG

THOMAS YOUNG was one of the greatest of Englishmen—a man, as the inscription on the slab beneath his medallion by Chantrey in Westminster Abbey affirms, “alike eminent in every department of human learning, patient of unintermitted labour, endowed with the faculty of intuitive perception, who, bringing an equal mastery to the most abstruse investigations of letters and of science, first established the undulatory theory of light, and first penetrated the obscurity which had veiled for ages the hieroglyphics of Egypt.” And yet this great man of surpassing genius and originality, this explorer, this discoverer, who has revealed to us some of the hidden truths of Nature of the deepest import; this accomplished scholar who has led us through one of the labyrinths of history, has not yet received one tithe of the praise to which he is entitled, and beyond scientific circles is still comparatively unknown. If even in cultivated society to-day you mention with respect the name of Young, it is generally thought that you refer, not to the brilliant physicist, but to the lugubrious author of the *Night Thoughts*, Edward Young, or to James Young, the originator of the paraffin industry, and there are certainly hundreds of thousands of people who are at this moment practically benefiting by Young’s work who have never heard of him.

It is probably the very universality of Young's achievements that has circumscribed his reputation. He was first of all a natural philosopher, skilled in mechanics, hydrostatics, hydrodynamics, acoustics, optics, astronomy, electricity and magnetism and every other branch of what the French call physics, but he was also a physician, a hydrographer, an entomologist, an actuary, a climatologist, a philologist and an Egyptologist, and while specialists in each of these departments recognise his distinguished ability and penetrating insight, there has been wanting such a conspectus of his work as would enable the world at large to perceive the breadth and towering ascendancy of his intellect. He had more than the versatility which legend ascribes to the admirable Crichton, and a grasp of every branch of knowledge he invaded that was peculiarly his own. He came as near omniscience as it is given to a mortal to attain. Young himself would probably have based his claim to remembrance on his medical studies and services to which he devoted the best years of his life, but looking back now, over the settlement effected by a century, we see clearly that it is upon his optical work that his primacy depends. Invaluable as were his researches and observations, and convincing as was his reasoning in other directions—he illuminated every subject he touched—it is upon his optical discoveries at two great epochs of his life—the first beginning with his *Memoir on the Structure of the Lens*, contributed to the Royal Society in May, 1793, and ending abruptly after his reply to the attack of the *Edinburgh Review* in 1804, and the second beginning with the publication of

Fresnel's *Memoir on Diffraction*, in 1816, and ending with his letters to Fresnel in 1824—it is upon the optical discoveries during these two great epochs of Young's life that his title to a high place in the Valhalla of Science must be founded.

In reviewing Young's life, one is first struck by the extraordinary mental precocity which he displayed. We have his own testimony that at two years of age he could read fluently, and that before he was four he had read the Bible twice through—with what digestion he does not mention—and also Dr. Watts' Hymns and *Gulliver's Travels*. When he was six, of his own motion, as a holiday task, he committed to memory the whole of Goldsmith's *Deserted Village*, and at the same age learnt the rudiments of Latin Grammar. Before he was nine he had taught himself arithmetic, and under an inefficient teacher had mastered Lilly's *Syntax*, Logan's *Corderius and Phaedrus' Fables*, and read for his own pleasure *Robinson Crusoe*, Gesner's *Death of Abel*, *Stories from Shakespeare*, and many other books.

I do not know of any instance of premature acquirements quite comparable to that of Young. Macaulay, who, when he was eight years of age, had written a compendium of universal history, and a Romance poem in the style of Scott, in three cantos, entitled *The Battle of the Cheviots*, had great tutorial advantages and stimulating home influences. John Stuart Mill, who learnt the Greek alphabet at three, and at eight had read *Æsop's Fables*, Xenophon's *Anabasis*, the whole of *Herodotus* and the Histories of Robertson, Hume and Gibbon, was remorselessly pushed on by an ambitious

father, but Young's early intellectual activity was spontaneous and without environmental encouragement, for although brought up in the pure and serene atmosphere of the Society of Friends, he did not find in it, as it surrounded him in his grandfather's house, where he spent most of his boyhood, any special inducements to exertion, mental or bodily. He owed, he thought, to the principles of the Society of Friends, and especially to its recognition of the immediate influence of a supreme intelligence as a guide to conduct, the formation of those habits of perseverance and that steady determination to overcome difficulties which distinguished him in later years, but it was an inborn impulse that enabled him to work out his own education with little assistance or direction from others.

This solitary and self-education of Young's with its deprivation of boyish amusements, while it had its advantages had also its drawbacks, and was responsible for some of his limitations. He had no opportunity for the interchange of ideas with other young minds, and so of gauging their difficulties and modes of thought where differing from his own, and thus he remained throughout life unsympathetic in style and lacking in intellectual condescension and plasticity. His statements were so condensed that they were often unintelligible even to well-educated people, and were unrelieved by any sparks of humour or literary ornament.

Young's isolation and self-reliance also betrayed him into a flagrant error from which one would have thought his own consciousness of power might have saved him. He repudiated genius and maintained that all minds

are originally of equal capacity and that all success is to be attributed to industry, quoting the lines :

“ Thou say'st not only skill is gained,
But genius too may be obtained,
By studious invitation.”

“ What is this about all men being equal? ” asked Carlyle : “ all potatoes are not equal ;” and it is hard to understand how Young, seeing, as he must have done, the bodily differences in human beings, recognising as he did the differences in the acuity of their senses and the size of their brains, could have brought himself to believe that it is possible by any amount of diligence to make a silk purse out of a sow's ear.

Still harder is it to understand how Young with his experience brought himself to take so narrow a view of education as he did. “ It is really very little,” he wrote, “ that a person who is seriously and industriously disposed may not obtain from books with more advantage than from a living instructor. Masters and mistresses are very necessary to compensate for want of inclination and exertion, but whoever would arrive at excellence must be self-taught.” Self-teaching may suffice for those endowed with Young's ability and appetite for knowledge, but for the mass of mankind human guidance is necessary if there is to be a well-balanced evolution of the powers of the mind. A purely bookish education is assuredly not the best.

Precocity such as that Young manifested often ends in early death.

“ So wise so young, they say,
Do ne'er live long.”

It is frequently associated with a constitutional predisposition to tuberculous disease, and that association was not wanting in Young's case, for there can be no question that at the age of fifteen he suffered, as he says, from pulmonary tubercles which, however, never "arrived at the stage of suppuration," and from which he happily recovered under a course of treatment which would not be sanctioned at the present day, including as it did bleedings and confinement to bed, with a diet of milk, buttermilk, eggs, vegetables and very weak broth.

But precocity that is not thus cut short by tuberculosis very often dies down of itself in a few years. It is a mere spurt of cerebral activity that soon exhausts itself. The infant prodigy becomes the adolescent dullard, but Young's precocity was of a different type. It was no unnatural excitement ending in exhaustion, but the early growth of a plant of exceptional vigour. At all ages he was intellectually in advance of his compeers. There was never any slackening or decline in his wonderful intellectual activity. When only fourteen he became a classical tutor, and during the five years for which he held that post acquired a thorough knowledge of Latin and Greek and a considerable acquaintance with Hebrew, Chaldee, Arabic, Syriac, Persian, French, Italian and Spanish, without neglecting mathematics. The soundness and extent of his study of mathematics may be inferred from his writings in after life, which touch upon many of the most abstruse applications of mathematics to Natural Philosophy and are often remarkable for the simple means by which the most difficult problems

are solved. At nineteen years of age he began his medical studies in London, and while pursuing them was constantly, at the house of his grand-uncle, Dr. Brocklesby, brought into contact with the most distinguished men of the day, who received and treated him as an equal. He was no shy medical student in a corner, but a man of parts, holding familiar intercourse with Burke, Wyndham, North, Sir Joshua Reynolds, Boswell, Dr. Laurence and Dr. Vincent, who deferred to him on questions of Classical Scholarship at a time when Classical Scholarship was more generally accepted as the hallmark of culture and was more punctilious than it is to-day. His singular gifts and capacity were recognised by all his uncle's guests, and Burke, who had formed a very high estimate of his powers, urged, with rare prescience, that he should be reared and cultivated in the best manner, so as to form his views that he might "emulate a Bacon or a Newton in the maturity and fulness of time."

Looking back on Young's education and early life for the first bud of his optical efflorescence, we find it in his tenth year, when the usher of the school in Dorsetshire at which he was a pupil, lent him Benjamin Martin's Lectures on Natural Philosophy, with the optical part of which, containing many detailed rules for the construction of optical instruments, "I was," he says, "particularly delighted." But the first practical step was taken a little later, at the age of twelve. "I had imbibed," he tells us, "a wish to study botany from a conversation with Morris Birkbeck, and in order to enable me to examine the minute organs of plants, I

was anxious to construct a microscope from the description of Benjamin Martin. For this purpose I procured a lathe, and I succeeded in getting the requisite materials by the assistance of my grandfather and one of my father's clerks. My zeal for botany during these operations was replaced by my fondness for optics, and subsequently by that for turning." On his return home from school he devoted his time to the study of Hebrew and to the practice of turning and telescope-making, apparently a somewhat incongruous combination.

It was no doubt his early interest in optics that led him when he became a medical student to investigate with special attention the anatomical structure of the eye, and it was now that he entered upon his fruitful voyage of optical discovery. He dissected the eye of an ox recently slaughtered, and observing its fibrous structure, previously noted by Leeuwenhoek and Pemberton, he fancied he had discovered in the arrangement and attachment of these fibres distinct evidences of muscularity. As we now know, he was wrong in that supposition, for the fibres are not muscular but epithelial, being composed of an anterior layer of cubical cells and posteriorly of long, transparent, flattened prismatic bands with a hexagonal transverse section and interlocking serrated edges. Most of these fibres still retain an elongated nucleus indicative of their epithelial nature, and are so arranged in concentric lamellæ, like the coats of an onion, as to give rise to a star-shaped figure at the back of the lens. But although Young was wrong as to the histological character of these fibres, and in his supposition that changes in the shape

of the lens were caused by their muscularity, he was right in affirming that changes in the shape of the lens do take place and that the accommodation of the eye to distance is dependent on these changes in shape. The changes in the shape of the lens are due to muscular contraction, but not that of the lens itself, in which it is elasticity and not contractility that is the efficient feature. Young was in error as to the *modus operandi*, but absolutely right as to the resulting functional alteration. He showed that there is no change in the length of the axis of the eye nor in the curvature of the cornea during accommodation to distance, and gave good reasons for believing that it is to an alteration in the convexity of the lens that that must be ascribed.

Young's Memoir on the Lens, the work, be it remarked, of a medical student at St. Bartholomew's, just twenty years of age, was read before the Royal Society on the 30th of May, 1793, and procured for him the honour of election to the Fellowship in the following year. But it procured for him also vexation of spirit, for no sooner did it appear than John Hunter, then at the height of his giant strength, claimed the discovery as his own. He died before he could vindicate his claim, as he proposed to do in a Croonian Lecture, but his brother-in-law, Sir Everard Home, took up his unfinished work, and by a series of apparently accurate and well-contrived experiments made in conjunction with Mr. Ramsden, an eminent optician, endeavoured to establish Hunter's priority in the discovery of the structure of the lens, and to refute Young's conclusions as to the part played by it in accommodation, and did

succeed in discrediting these conclusions for a time. In the meantime, Young had gone to Edinburgh to pursue his studies in that famous School of Medicine, the merits of which he appreciated. "With respect to the study of physic," he wrote, "it appears to me that Edinburgh is beyond comparison preferable to Oxford and Cambridge, and in other respects little inferior." The great Edinburgh teachers of the time—Black, Duncan, Bell, Home—secured his approbation with one exception, and that perhaps the greatest of them all, the celebrated anatomist Monro, and his prejudice against him was, I think, of optical origin. "When lecturing on the eye," Young said, "Monro noticed Hunter's having claimed the discovery of its being fibrous, and said that it had been known for a century, and that he had always taught the same; this was received with applause from his pupils, who always encourage his avarice of priority; in this case, although Monro deserves nothing, I was not displeased that Hunter's pretended originality was disallowed."

It was in Edinburgh that Young received Sir Everard Home's Croonian Lecture, which he weighed carefully, and which seemed to him to put an end to his hypothesis of the action of the crystalline lens in adjusting the eye to different distances. With that superb scientific honesty which always distinguished him, he at once confessed himself discomfited, and abandoned his position, communicating his change of opinion to Monro, who did, he thought, scant justice to Sir Everard Home in a subsequent lecture, "in which," said Young, "he passed over in a very uncandid manner the experi-

ments, stated in the Croonian Lecture, insinuating, as is too common with him, that he had himself made observations of a similar nature.”

It was Home and Ramsden's experiments that led Young to relinquish his own view and accept theirs that in the adjustment of the eye to different distances it is the length of the axis and the curvature of the cornea, and not that of the lens, that is concerned, and what impressed him more than anything else was the statement that the eye of a man in which the lens had been couched was still capable of this adjustment. He could not repeat the experiments at the time, and so accepted their validity, but later, and before the production of his great paper on the “Mechanism of the Eye,” which was a turning point in optics, by another series of experiments of great delicacy and intricacy he routed Home and Ramsden and resumed his former position. His original conclusions were completely verified. The most decisive of his experiments was that in which the eye was put under water, when, as he demonstrated, the power of accommodation was not diminished, although the action of the cornea was excluded, the only possible explanation being that the curvature of the lens became increased. He made observations which, as he said, amounted to a mathematical demonstration of his solution of the problem, these observations showing that the accommodation is much stronger in the centre of the pupil than near the margin, a circumstance which proves that the surface of the lens flattens near the margin, at the same time as the curvature increases in the centre. As regards the

crucial observation on the couched eye, he showed that it was fallacious, for in several young subjects who had been operated on for cataract he found that the power of accommodation was completely lost. In Home and Ramsden's case, and in others that have been recorded where eyes from which the lens had been removed seemed still to possess some accommodation, we must suppose that no real accommodation took place, but that the pupil contracted when a near object was looked at, and so assisted in making vision more distinct.

Convincing as Young's paper on the Mechanism of the Eye was, it did not at once secure the acceptance of his views. That only came gradually through confirmation by subsequent independent observations, and may be said to have become universal only since Sir William Bowman and Brücke—almost simultaneously in 1848—revealed the way in which change in the curvature of the lens is produced. It cannot now be questioned that accommodation for near objects is brought about by a contraction of the ciliary muscle dragging forward the choroid and ciliary processes, and so permitting the compressed elastic lens to bulge forward.

Memorable as was Young's work on the Mechanism of the Eye, infinitely more far-reaching in its influence was his Wave Theory, which he communicated to the Royal Society in his Bakerian Lecture on "Outlines and Experiments respecting Sound and Light," in January, 1800. In this paper he dealt with the interference of sound, and it was his researches on this subject that led him on to the discovery of the inter-

ference of light, dealt with in his Bakerian Lecture in 1801 on "The Theory of Light and Colours." Newton considered the sensation of light to be aroused by the darting into the eye, and impinging against the retina, of particles inconceivably minute, while Huyghens supposed that it resulted from the impact of minute waves against the retina. Young, favouring Huyghens's notion, developed his undulatory theory, "which," as Sir John Herschel said, "has proved the key to all the more abstruse and puzzling properties of light, and which alone would have sufficed to place its author in the highest rank of scientific immortality, even were his other almost innumerable claims to such a distinction disregarded."

It would be indeed superfluous to rehearse, even in the briefest way, Young's momentous exposition of the undulatory theory—or to refer to the difficulty he had in meeting—he never succeeded in entirely surmounting—the objection arising out of Newton's assumption of a fluid medium as the vehicle of light, or to describe his brilliant application of the theory in explanation of Newton's rings and in accounting for the diffraction or inflection of light, that is to say, the effects produced by its bending round the edges of bodies.

It was probably Young's first paper on the Wave Theory that led to his connection with the Royal Institution of Great Britain. He joined it as professor of Natural Philosophy in 1801, the year after it had been called into being by that remarkable British-American, Benjamin Thompson Count Rumford, acting in conjunction with Sir Joseph Banks. A man of science, a

philanthropist and an administrator, Rumford imparted to the Institution, although he soon deserted it, an impulse which has carried it on to this hour, and which still sustains it. He designed it to be a metropolitan school of science and research, a library of philosophical books, a museum of chemical apparatus and a school of technology, in which practical application should be given to scientific teaching and useful projects promoted, and he conferred a signal service upon it and upon the world at large by selecting, with keen discrimination, as its first Assistant Lecturer in Chemistry, Director of the Chemical Laboratory and Editor of the *Journal*, under the charter he had procured for it, Sir Humphry Davy, and as its first Professor of Natural Philosophy, Dr. Thomas Young, who accepted the post at a salary of £300 a year.

At the time of his selection Young had fixed his ambition on success in the profession he had adopted and had commenced practice at 48 Welbeck Street, but then, as now, a physician's practice in London was of slow growth and Young was glad while his was growing to devote himself to those scientific pursuits in which he rejoiced and was an adept. He entered on his duties in Albemarle Street with zest, and carried them on with unflagging "energy," to use the word which he himself has added to our language. His first lecture was delivered on the 20th of January, 1802, and between that date and the 17th of May, when his course was closed, he delivered thirty-one lectures. In the following year there were twenty-nine lectures in addition to the thirty-one, and the whole sixty

lectures were published four years later in his compendious work, entitled *A Course of Lectures on Natural Philosophy and the Mechanical Arts*. Had the Royal Institution never done anything else but evoke this work it would deserve well of mankind for all time, for the work must be regarded as one of the sacred books of Physical Science, full of wisdom and inspiration, which it is obligatory even now on every student of physical science to read, mark, learn and inwardly digest. It is, as Lord Rayleigh has said, a very remarkable book which is not yet known as widely as it ought to be. Its expositions have never been excelled in soundness, and it contains many things that are not to be found elsewhere, and penetrating anticipations of later theories.

This great work consists of two quarto volumes of about seven hundred and fifty pages each. The first volume includes the lectures with forty plates and nearly six hundred geometrical figures and maps, all drawn by Young's own hand, and the second embraces the mathematical elements of Natural Philosophy, and an elaborate catalogue of works and memoirs relating to the various subjects to which the lectures referred. Not one hundred and twenty orations would suffice to make clearly intelligible by dilution these sixty lectures. They were well received at the Royal Institution—where unintelligible lectures are still not unknown—for they were novel in character, gave evidence of peerless, if somewhat incomprehensible power and knowledge, and now and then flashed out some striking and immediately perceptible gleam of truth. But they were

compressed to suffocation, and it must have been impossible for those who listened to them, not possessing Young's intuitive capacity of connecting distant points of demonstration, without the aid of the intermediate framework, to carry away a single definite conception of either the propositions or their proofs. And yet these lectures are to the qualified student of to-day rich mines of wealth. They are replete with profound reflections and pregnant suggestions, are unequalled in the precision and accuracy of enunciation of legions of propositions and facts, and for the boldness with which they explore new territory. It was in one of these lectures that Young, repeating what he had said in his Memoir of the previous year on *The Mechanism of the Eye*, described his optometer which enabled him to determine with precision the refraction of the eye—an instrument which was the precursor of the ophthalmometer as in use to-day, and the first step in the elucidation of astigmatism, that defect of the eye due to different degrees of curvature, the detection and treatment of which in its various phases, is one of the oculist's most important and frequent duties to-day. It was in the eighth lecture on Cohesion that the term "energy," now in such constant use, was introduced.

In the third lecture, on Physical Optics, is set forth the theory now known as the Young-Helmholtz theory, which refers all the sensations of colour to three primary sensations—red, green and violet—a theory which still holds its own against the rival theory of Hering, which is regarded with favour by some physiologists, but in respect to which certain phenomena incompatible with

it have been pointed out by Tscherning. In other lectures, "Elastic Resilience," the "Cohesion of Fluids," the "Measure and Nature of Heat" (tabooing caloric, and expressing the hope that philosophers would cease to regard heat as a separate entity and conceive of it as a mode of motion), and other scientific topics are found to be admirably handled whenever the verbal obscurity in which they are wrapped up is penetrated. In all the lectures there lie *perdu* for those who can detect them marvellous foreshadowings of scientific discoveries that have since been made and, I doubt not, of scientific discoveries that are yet to come. He laid down the principles which, seven years afterwards, Dr. Wells so happily brought to bear upon meteorological phenomena in connection with dew. He foresaw Röntgen rays and electrons, for in his optical memoirs he spoke of the luminiferous ether probably pervading the substance of all material bodies as freely as wind passes through a grove of trees. "And besides this possibility," he went on, "there is still room for the supposition that even the ultimate particles of matter may be permeable to the causes of attractions of various kinds, especially if these causes are immaterial; nor is there anything in the study of physical philosophy that can induce us to doubt the existence of immaterial substance; on the contrary, we see analogies that lead us directly to such an opinion. The electrical fluid is supposed to be essentially different from common matter."

It is alleged that Keats' life was shortened, and the world thus robbed of much subtle beauty, by the

attacks on "Endymion" of the *Quarterly Review* and of the "Blackguards' Magazine," as Landor called *Blackwood*. It is certain that Young's scientific career was for a time blighted and the power he should have exerted on scientific progress paralysed by an attack by the *Edinburgh Review* on his *Memoirs on the Theory of Light, on the Production of Colours and on Physical Optics*, contributed to the *Philosophical Transactions* in 1802 and 1803. A young, raw-boned Scotchman, afterwards Lord Brougham, a man of prodigious vigour and self-complacency, audacious, dictatorial, voluble, who had, when only seventeen years old, himself contributed to the Royal Society a paper on "Some new Phenomena of Light and Colours," assailed with sarcastic bitterness in the pages of that *Review* Young's undulatory theory. Intellectually, and in scientific attainments, incomparably inferior to Young, Brougham was able to put his intemperate and erroneous criticisms in so specious a manner and in such felicitous language that they appealed to and convinced the ignorant or indifferent reader; but to-day, when we are able to see through Brougham's sophistries and to appreciate the truthful profundity of Young's work, Brougham's words and his conduct, for he tried to have Young's papers excluded from the *Philosophical Transactions*, seem unscrupulous and reprehensible.

"Has the Royal Society," asked Brougham, "degraded its publications into bulletins of new and fashionable theories for the ladies of the Royal Institution? Let the Professor continue to amuse his audience with an endless variety of such harmless trifles, but, in the

name of science, let them not find admittance into that venerable repository which contains the works of Newton and Boyle and Cavendish and Maskelyne and Herschel." It makes one smile to read such words applied by a budding barrister, who in a lifetime of ninety years, although he earned a title and lots of money, did nothing of permanent value, to one of the greatest natural philosophers the world has seen in connection with a discovery that has proved of the first magnitude.

Unlike Keats, Young, although wounded, did not succumb to the injury inflicted on him. He replied to Brougham, fully vindicating his position and retaliating on his reviewer with just severity, but this masterly rejoinder had practically no effect in counteracting the destructive influence of the assault. There was in those days but a small scientific audience capable of understanding the controversy, and that audience Young's pamphlet never reached, for, as he has told us, only one copy of it was sold. In those pre-advertising days, no steps were taken to make it known, and the poison worked its way, while the antidote remained bottled up, the consequence being that for thirteen years Young and his researches on light had no place in public thought. His immortal discovery lay moribund until it was resuscitated by Arago and Fresnel. The latter, with a hint from the former, had the glory of rediscovering what Young had discovered sixteen years before, but had been hidden away, and the source of which he chivalrously acknowledged, and of building on the foundation which Young had laid. As I think

of the part Fresnel then played, it occurs to me as curious that the world is under a debt of gratitude to two young French Engineer officers, who were contemporaries, to Claude Joseph Rouget de l'Isle, a Lieutenant of Engineers, who in one night composed the words and the music of the *Marseillaise*, and to Augustus Jean Fresnel, also a Lieutenant of Engineers, who rescued from oblivion Young's theory of light, and by his exquisite ingenuity swept away difficulties which Young had failed to overcome.

Mr. Devereux Marshall, in a paper in the *British Medical Journal*, defending Dr. Edridge Green's opinions on colour-blindness, said that he had been treated "like Young, who had to resign his Professorship at the Royal Institution on account of his views on light, which have since received universal acknowledgment." That is a mistake, though no doubt a pardonable one. Young's views on light had nothing to do with his retirement from the Royal Institution. Those views, which were communicated, not to the Royal Institution, but to the Royal Society, in three Memoirs, in November 1801, July 1802 and November 1803, had assuredly been subjected to no critical examination by any member of the Institution, and as the *Edinburgh Review* was not founded until 1802, Brougham's ferocious onslaughts did not gain currency until after Young had resigned his professorship in July 1803. No pressure of any kind was brought to bear upon him to do so. His lectures were not popular, but they were well attended, and their learning and originality were recognised, and he might have gone on delivering

them for years had he been so disposed. It was no *vis a tergo*, but an alluring vision of success in his profession, which, ever after he entered it, exercised a controlling influence over him. After holding the professorship for two years, he felt, and his friends supported him in his belief, that his longer tenure of it would be injurious to his professional prospects, as the public require whole-hearted service in those to whom they resort for medical advice, and regard with suspicion any excursions, however successful, into collateral scientific or literary pursuits. He therefore ostensibly gave up physics for physic, and although he continued to contribute articles to scientific journals, these were anonymous, and he was supposed to be absorbed in medical avocations. It was the sudden cessation of his scientific activities that created the impression that he had been snuffed out by the *Edinburgh Review*.

Of Young's medical life and work, I need say little. He was a successful and distinguished physician, foremost amongst the men of his day. He made many useful additions to medical knowledge, but his name is not associated with any notable advance, and, reviewing his medical writings as a whole, one cannot but regret that he did not spend in the laboratory the time that he devoted to the clinical wards. Everything that he did bears the stamp of insight, caution, judgment and learning, but he was more at home with physical than with biological problems.

Young had singular advantages at every step in his medical pilgrimage. When he began his studies in London he had the best teachers of the time in the

Hunterian School of Anatomy, and during their continuance, he was a constant visitor at the house of his grand-uncle, Dr. Brocklesby, where he met the most eminent medical practitioners and men of letters of the era, intercourse with whom must have been a powerful mental stimulus, must have rubbed off any rough angles he had brought up from Somersetshire with him, and must have added to the composure and self-restraint he derived from his Quaker upbringing, that refinement and confidence of manner for which he was remarkable and which are no trifling assets to the Metropolitan physician.

In Edinburgh, where he went to carry on his medical studies in 1794, he had a galaxy of great teachers, and his time there was more that of a man of fashion than of a medical student. His reputation had preceded him, and he had letters of introduction to the leaders of Society. Not his the attic lodging, spare diet and shabby coat which were the lot of most Edinburgh medical students then, but luxurious apartments, rich attire and symposia with Lord Monboddo and the most scholarly men of the modern Athens of the period.

It was in Edinburgh that, like another illustrious man of science, Lord Lister, he dropped the external observances of the Society of Friends, some of the tenets of which he had before laid aside. He gave up their usual form of address, mixed freely in society, learnt dancing, played the flute, and went repeatedly to the theatre. At Groningen, where he proceeded from Edinburgh, he took lessons in horsemanship, and at

Brunswick, where he had an introduction to the Duke, he appeared at a Court masquerade in the character of Harlequin, which gave him an excellent opportunity of exhibiting his personal agility.

Made independent in 1797 by his grand-uncle's bequest of his house in Norfolk Street, Strand, and of £10,000, Young took the M.B. degree of Cambridge in 1803, married in 1804, and settled down to professional work, which he carried on in London and in Worthing, where he spent the three autumn months until his retirement in 1814. He was a lecturer at Middlesex Hospital and an examiner of the Royal College of Physicians, and in 1811 was appointed to St. George's Hospital, an appointment which in those days generally introduced to the best practice in London, and which he retained till the end of his life. He was assiduous in his attention to his hospital duties, but failed to attract pupils, the number attending his lectures being always small when compared with those who attached themselves to other teachers. His manner was wanting in warmth and earnestness; and he did not enter into the difficulties of the students, skipping the explanatory dissertations which they most required. Besides, he was in advance of his time—the time of what was called vigorous practice, when the lancet and calomel were in the ascendant, and when symptoms were rudely interfered with. He could not altogether shake off the trammels of the existing system, but he stigmatised the rule of thumb of the practical man, as he was called, and taught a careful induction from observation and a patient waiting on Nature.

Young made many contributions to medical literature that were important in their day and that are still deserving of consideration. The most noteworthy was his Croonian Lecture of 1808, in which the laws regulating the flow of blood through the body are clearly stated. The most elaborate was his *Medical Literature and Practical Nosology*, 1812, containing an admirable essay on the Study of Medicine, a still more admirable sketch of Animal Chemistry, from which many curious prognostications might be culled, and a ponderous classification of disease, no doubt edifying when it was prepared, but now considerably out of date. The most interesting of his essays now is the last, a *Practical and Historical Treatise on Consumptive Diseases*, published in 1815, in his medical maturity, and the fruit of ripe experience and laborious compilation. It was, one is bound to admit, a pot-boiler, for his biographer tells us that "it was undertaken with a view to the possible extension of his practice, in a form of disease prevalent amongst the upper classes of society," and appallingly fatal, for Young tells us that of a thousand persons attacked and left without medical assistance, not one recovered, while of a thousand who had the benefit of the utmost power of medical art, not more than one in a hundred was found curable. The work failed to accomplish its object, but it must have done much to enlarge the medical view of consumption and to improve the treatment of it at the beginning of the last century. As in all Young's works on all subjects, there are scattered through its pages remarkable forecasts of future developments. He was not original in regarding consumption

as contagious, for Galen, Morgagni, Valsalva, Raulin, Grieve and many others had maintained that, but he accepted the doctrine at a time when it was discredited, and after nicely balancing the evidence pro and con said, "It would be unjustifiable to expose any person who appeared to have the slightest predisposition to the disease to any intimate communication with a consumptive patient, as, for instance, to sleeping in the same bed or living constantly in the same room." He discarded the inflammatory theory of the disease, and pronounced it a hectic fever, and came very near the recognition of a tuberculin toxin when he said that "the hectic and constitutional disturbance may be due to the state of the fluids secreted by the diseased parts."

But it is in physical diagnosis that he is most anticipatory of subsequent progress. Fifty years before Wunderlich and Allbutt he pointed out that the temperature, as indicated by the thermometer, measured under the tongue or in the axilla affords a criterion of the severity of the disease, noting that the rise of temperature in advanced cases was seldom less than 2° Fahr., and was often as much as 4° or 5° , the exacerbations of fever beginning in the afternoon. He named percussion, recommended the employment of the spirometer, and invoked the aid of optics in the examination of the expectorated matter. "If," he said, "we put a small quantity of the substance to be examined between two pieces of plate glass, which may be carried in the pocket for the purpose, and holding it near the eye, look through it at a distant candle, we shall observe

the appearance even in the daytime of a bright circular corona of colours, of which the candle is the centre; a red area, surrounded by a green circle, and this again by another of red, the colours being so much the brighter as the globules (that is, globules of pus) are more numerous and more equable. If the substance be simply mucus there will be no rings of colour, although sometimes there is a sufficient mixture of heterogeneous particles, even in mucus, to cause the appearance of a reddish area only about the candle.”

There is one of Young's medical works that has passed into complete oblivion, and of which, I am sure, even those who are best acquainted with his writings have never heard, and that is a treatise on insanity. That treatise, published in the *Quarterly Review* of August 1809, was written at the suggestion of Sir Walter Scott and Mr. Ellis, but not without an ulterior object, which was to secure to Young an appointment as Visitor in Lunacy under the Court of Chancery. The treatise at the time was regarded as of considerable merit, dealing with insanity in its moral and metaphysical, as well as in its medical aspects, but I feel sure that no one except myself has read it during the last hundred years, and I cannot now recommend its perusal. It is Young's, and, of course, it contains some pointed and suggestive remarks, but except in the contention that insanity is never purely mental but always dependent on some bodily disease it is in no way in advance of many other books and essays on insanity of that period. Young had evidently had no personal experience of

insanity. The cases he quotes are fantastic concoctions or highly decorated instances from other authors, one of them from a note to one of the Waverley novels. Some of the theories propounded, such as that the cause of sleep is distension of the arteries of the brain or of some part of it, are quite untenable, and it is certainly disappointing, seventeen years after the establishment of the Friends' Retreat at York by William Tuke, to find one, who by descent and early training belonged to that fraternity, supporting corporal punishment of the insane in certain cases, the strait-waistcoat, confinement in a dark room chained by one leg and with metallic manacles on the wrists, where fury and violence were exhibited, and cruel and futile methods of frightening patients back into mental health, as by a circular swing invented by Dr. Erasmus Darwin (more's the pity!) in which they were rotated, with immense rapidity, until terror, with sickness, vomiting and sometimes fainting, were induced. It was Young's imagination and fellow-feeling that were at fault, or he would never have countenanced such pitiless proceedings.

Taking Young's medical works as a whole, and including his essays and reviews, which are very numerous, they must be recognised as proof that he stood in the very first rank of the physicians of his time. His greatness in other departments has dwarfed his medical attainments, but had these stood alone they must have made him eminent amongst his contemporaries. He lived in a transition period, and he was a leader of the new school which aimed at connecting medicine with

physical science, at increased attention to morbid anatomy, and at more scientific methods of studying disease. The spell of Hunter was upon him, Jenner was his contemporary, Baillie his teacher, while side by side with him were Charles Dew, who, like himself, was both a natural and a medical philosopher, and who wrote the celebrated *Essay on Dew*, and a less celebrated but valuable work on *Urinology*, and Robert Wilan, who, avoiding the abstract and hypothetical, and adopting the natural history method, put the study of skin diseases on a sound basis, and laid down the lines for modern research. Young viewed the science of medicine as a branch of inductive philosophy, founded upon observation and experiment, where facts were to be divested—as much as possible—of all circumstances extraneous to the conclusion to be drawn from them, and where the conclusion itself was to be tested by repeated appeals to experience. That Young was not only a great theoretical but a sound practical physician is clear if the statement of the apothecary of St. George's Hospital is to be trusted, that a greater proportion of the patients admitted under his care were discharged recovered than of those admitted under the care of his colleagues who attracted more students and pursued more drastic treatment.

After Young's physical and medical researches, his hieroglyphical investigations bulk most largely. They occupied a principal share of his attention, for fourteen years from his first examination of the Rouse-Boughton papyrus in 1814 till his visit to Paris in 1828, and they

betoken enormous labour and a singular facility in disentangling the most intricate and perplexing questions. To Young, an Englishman, and to Champollion, a Frenchman—Bunsen came much later—we owe primarily the reading of many of the dark but fascinating riddles of the avenues guarded by the Egyptian Sphinx. I am, of course, quite incompetent to estimate the value of Young's Egyptological work, but Professor Flinders Petrie—and there is no higher authority—tells me that to him belongs the merit of analysing the demotic of the Rosetta Stone and many bilingual contracts. "His was a great advance which paved the way for philological work. His work was like that of anyone analysing the Greek scrawl by means of a German translation, and so recovering the sense of whole words without any idea of their origin or sound."

The Rosetta Stone, to be seen in the British Museum, was the starting point of the interpretations of much ancient history.

I have glanced at some of Young's main activities, but these convey but an inadequate idea of the whole breadth and depth of the achievements of this inimitable man. Comparing his genius to some noble mosque, I would say that his optics are represented by the central dome, which is surrounded by innumerable cupolas and minarets, each with a meaning and message of its own, and all contributing to the impressive grandeur of the mass. He was a multi-specialist, but a cosmic philosopher, his undertakings were multifarious, but they were unified in aim. It is only by looking into

his subsidiary themes that a just conception of his capacity can be formed. In office he was a pluralist, in his writings copious beyond example, and had there been a *Who's Who* in his day he must have engrossed several columns of it. He was not only a Professor at the Royal Institution, a Physician to St. George's, and a Lecturer at Middlesex Hospital and Examiner to the Royal College of Physicians, but Foreign Secretary to the Royal Society (he coveted the Secretaryship when Davy was appointed to it), Superintendent of the Nautical Almanac, Secretary to the Board of Longitude, Secretary to the Commission for ascertaining the Length of the Seconds of the Pendulum, Inspector of Calculations to the Palladium Insurance Company, President of the Egyptian Society, Member of a Committee to investigate the dangers resulting from the General Introduction of Gas into the Metropolis, and so on. The catalogue of his writings includes, besides the substantial works already named, eighteen articles contributed to the *Quarterly Review*, and sixty-three to the *Encyclopædia Britannica*. Amongst his miscellaneous interests were the Theory of Bridges, Carpentry, the Theory of the Tides, Magnetism, which he erroneously declared had no connection with electricity (even Jupiter may nod), Mr. Dickwell's Observations on artificial selection of cattle, and Darwin's Zoonomia.

In consonance with his opinion that the original mental differences between human beings are much less considerable than is generally supposed, Young held that the doctrine of the division of labour, however

applicable to material products, is not so to intellectual pursuits, and that if acted on it must go to reduce the dignity of man in the scale of rational existence. He was misled by his own catholicity, although even he had his limitations, and we should never probably have heard of him had he devoted himself to poetical composition. But his catholicity was unique, and for men of average ability, not fashioned as he was, concentration of research within well-defined boundaries is needful, and has become more and more imperative since his time by the enormous expansion of knowledge that has taken place. Close specialism has its drawbacks, but so has a variorum tillage of the mind. Concentration of research within the confines of some defined portion of science is better than any endeavour to embrace the whole. Our activities should be exercised within a given compass, but all the more must we admire that great optician who was able with power and profit to range over the whole wide field of human knowledge.

CRAIGENPUTTOCK

“It is curious,” the late Lord Houghton once said, “that Carlyle should be associated with places with such odd names as Ecclefechan and Craigenputtock.” But the association of Carlyle with those places was more than nominal. Each of them contributed something to his mental fabric. Nurture is for the moment at a discount. Nature rules the roost. But the weather not less than the quality of the seed determines the ultimate value of the crop, and the accessories of inborn genius at every stage in its growth, and especially when it is still young and succulent, leave their mark on its performances. As the darkness began to fall, Kant always fixed his gaze on the tower of a church opposite his window. This tower strangely dominated his thoughts and seemed to him so to help them that when the view of it became obscured by the growth of his neighbour’s poplars he found himself arrested in his speculations. The course of his thoughts only flowed freely again when the poplars were cut at the top so as to bring the familiar object once more into view.

Had Carlyle never sat as a child on the coping of the wall opposite his humble birth-house at Ecclefechan, consuming his evening meal—oatmeal porridge and milk—from his porringer and “watching the distant mountains in hues of gold and azure and hush

of worldly expectation as the day died," we might never have had *Sartor Resartus* as we know it.

Had Carlyle never, while still in his prime, "a lonely scholar," as Emerson said, "nourished his mighty heart" amidst the heathery hills that surround Craigenputtock, listening to the black-faced sheep nibbling the grass, and marvelling at the mysterious stars, we might never have had that great prose epic the *French Revolution* with its Ossianic background of storm and mist and lightning.

Natural beauty on the one hand and civic ugliness on the other may each have an enduring influence on character and spirit.

To Ecclefechan and Craigenputtock, Dumfries is the stepping-stone. It lies midway between them, as the crow flies, sixteen miles from each, a quaint old town as Carlyle knew it, redolent of recent memories of Burns, individualised by the steeple of St. Michael's Church, bald, simple, but impressive as the Old Hundredth psalm. The Queen of the South, as its denizens call it, is throned in billowy lowland scenery bristling all round with points of interest in Scottish history. It is from Dumfries that the road to Craigenputtock starts, that road so often traversed by Carlyle and his wife during their seven years' sojourn there—a road wreathed in ever-changing rural beauty and studded with spots over which precious memories hover. In its first mile it passes not far from the wreckage of Lincluder Abbey, with its still chastely sculptured tomb of King David's daughter, Lady Margaret Douglas.

A little further on it skirts a green mound that marks the site of the cottage-home of Helen Walker, the prototype of Jeanie Deans, and at the fifth mile it leads to Irongray Churchyard, where may be seen Helen Walker's grave and the tombstone erected to her memory by the author of *Waverley*. In two miles more the road crosses the Routen Brig—the Routing Bridge Carlyle said was the correct name, given it because the noise of the water, tumbling down the deep, rocky, tree-embowered linn, resembled the bellowing of cattle—and then it winds round Irongray hills into a beautiful valley at first well wooded and then heath and furze, giving a glimpse in the distance of the eminence on which stand the massive ruins of the tower of Lag, the Redgauntlet Castle of Wandering Willie's tale. Curving to the west and entering the pass of Glenslin, with the Border Keeps of Bogrie and Sundaywell on either hand, the road climbs and meanders across the open heath, with its bosses of granite boulders, until it reaches Craigenputtock, the Crag of the Hawks, the unpretentious farmhouse, around which gusts of literary controversy have swirled.

It suited Froude, the unjust steward of biography, to represent that Carlyle was selfish, heartless, cruel in taking his young wife to Craigenputtock, in keeping her there so long, and in subjecting her to privations and drudgery while she was there. "It was," he said—although he had no personal knowledge of it—"the dreariest spot in all the British dominions." "A sterner spot," he declares, "is scarcely to be found in

Scotland.” “The nearest cottage is more than a mile from it; the elevation, seven hundred feet above the sea, stunts the trees and limits the garden produce to the hardiest vegetables. The house is gaunt and hungry-looking. The landscape is unredeemed either by grace or grandeur, mere undulating hills of grass and heather with peat bogs in the hollows between. Craigenputtock, sixteen miles from the nearest town and the nearest doctor, cut off through the winter months from the outer world by snow and flood, in itself grim, gaunt and comfortless, was not a place to which to take a delicate and delicately nurtured woman.” “No wonder Mrs. Carlyle shuddered at the thought of making her home in so stern a solitude.”

That is how Froude described a substantial two-storey farmhouse on a moorland farm of 800 acres in the lowlands of Scotland where the climate is mildest, for the prevailing south-west winds bring a sough of softness from the Gulf Stream, that is never cut off from the outer world for more than a day or two at a time by snow or flood, that commands an enchanting view of heathery ridges stretching away to green pastures and corn-lands with glimpses in the distance in clear weather, from the hill-tops, over the Solway brine, as far as that “sapphire promontory that men call St. Bees,” lapped in the purest of pure air, bathed in untainted sunshine and with a sky and cloud canopy of ever-shifting sublimity. The house is surrounded by a fringe of fine trees, spruces, rowans, scotch firs, and on the avenue, now grass-grown, leading up to the front of it, there

are ashes, oaks and chestnuts that would do no discredit to an English park. After reading Froude's Cimmerian sketch of Craigenputtock, one wonders where he would have found terms appropriate to Loch Cornish and the savage wilds that lie north of Strath-nardell and Dunskey. How must his sympathies have gone forth to the Brontës, delicate women too, who spent almost all their days on the "Wuthering Heights" of Haworth. The well-to-do farmers of Dunscore hearing his indictment of their parish in which Craigenputtock is situated, would pronounce him "daft."

No doubt Froude found in Mrs. Carlyle's letters what he regarded as warrant for his denunciations of Craigenputtock. She called it "a little estate of peat-bogs," "a most dreary and untoward place to live in," "a peat moss desolation," and, quoting Jeffrey, "a Siberia." But it was chiefly from Miss Geraldine Jewsbury, "that flimsy tatter of a creature," as Carlyle called her, that he derived the sombre pigments he has introduced into his picture of it. That dismal picture has been accepted, embellished, touched up with burnt-umber irony and passed on from one writer to another. One recent writer, after gazing at the picture, has convinced himself that Mrs. Carlyle suffered at Craigenputtock "the horrors of solitude," and became "weary, haggard and terrible," and has asked whether there was not "enacted in that gaunt farmhouse one of those fierce tragic and perilous dramas which end in the dock and on the scaffold among people of a lower grade?" all which is unutterable and most offensive nonsense.

“Geraldine’s Craigenputtock stories,” wrote Carlyle, “are more mythical than any of the rest. Each consists of two or three, in confused exaggeration.” As for Mrs. Carlyle’s reminiscences of the place, she was, it must be remembered, past-mistress of hyperbole and delighted in grotesque distortions and in making mountains of molehills. It was she who first suggested Craigenputtock as a home for herself and her husband. No doubt she shrank from this idea when Carlyle seriously entertained it, but after two and a half years of Edinburgh she realised that at Craigenputtock he would find that independence and simplicity of life and freedom from distraction which would, at that stage, best conduce to the growth and manifestation of those singular gifts she recognised in him, and on which depended the gratification of her own vaulting ambition for him. She inspected the place before settling there when it was at its worst on a cold, blusterous March day, and she went there after it had a storey added to it and been greatly improved, without reluctance, one might say with alacrity. However she might flout and jeer and play the victim, she never truly regretted the seven years spent at Craigenputtock. “We were not unhappy at Craigenputtock,” wrote Carlyle, “perhaps those were our happiest days; useful continuous labour essentially successful; that makes the moor green. I found I could do fully *twice* as much work in a given time there as, with my best effort, was possible in London.” The Dunscore Patmos he called Craigenputtock when writing to his brother. He was by no

means ashamed of it, for he had a sketch made of it by Mr., afterwards Sheriff, Moir and sent it to Goethe, who had it engraved for his translation of Schiller.

Within a stonethrow of Craigenputtock was the cottage built for and inhabited by Carlyle's brother Alexander, who worked the farm, and within 15 miles of it was Templand, Mrs. Carlyle's mother's home, which she frequently visited. The monotony of the moorland life was relieved by excursions to Dumfries, to which Mrs. Carlyle galloped off on her stout little horse, Harry, whenever the humour seized her, and by the visits of friends and relations. The visits of friends were memorable. In their first autumn at Craigenputtock came Jeffrey, his wife, daughter and a maid, all comfortably accommodated for several days in what Froude would have us believe was a meagre dwelling, and in the following summer Edward Irving, then at the height of his meteoric career, suddenly appeared as frank and happy as he had ever been in the days gone by. He stayed two days, sauntering about with his host and hostess in the green solitudes through the long bright summer evenings and preaching on the Sunday in Dunscore church to a congregation of two or three thousand that overflowed into the churchyard, where, however, his clarion voice reached them all. Carlyle accompanied him to church and reported that the sermon "flowed along like a true discourse from the inner reservoirs to which everyone seemed to listen with respectful satisfaction," but Mrs.

Carlyle stayed at home and prepared supper, alleging that she never did like sermons.

In August 1833 Emerson descended on Craigenputtock. As the Carlyles were sitting at dinner one Sunday afternoon a carriage drove to the door and there stepped from it the young Bostonian, still unknown to fame, who had read Carlyle's articles and felt in them a magnetism that drew him irresistibly to the cell of the recluse, and so enabled him to bequeath to us a vivid and veracious account of it. "Of course we could not do other than welcome him," wrote Carlyle, "the rather as he seemed to be one of the most lovable creatures in himself we had ever looked on. He stayed till next day with us and talked and heard talk to his heart's content, and left us all really sad to part with him." The fragments of that talk that survive make us wish that it had been fully recorded. "We went out to walk over long hills," says Emerson, "and looked at Criffel, then without his cap, and down into Wordsworth's country. Then we sat down and talked of the immortality of the soul. It was not Carlyle's fault that we talked on that topic, for he has the natural disinclination of every nimble spirit to bruise itself against walls, and did not like to place himself where no step can be taken. But he was honest and true, and cognisant of the subtle links that bind ages together, and saw how every event affects all the future. "Christ died on the tree; that built Dunscore kirk yonder: that brought you and me together. Time has only a relative existence." Emerson carried away with him an

understanding of Carlyle and became his greatest benefactor.

Jeffrey came again to cheer them with his Edinburgh gossip. He said he expected to find that Mrs. Carlyle had hanged herself on a door-nail, but she, bright and vivacious as ever, held her own in their wit combats. "Jeffrey one of the nights," wrote Carlyle, "young laird of Straquhan present, what with mimicry of speakers, what with other cleverness and sprightliness, the most brilliantly amusing creature I have ever chanced to see."

Winter was, no doubt, dull enough at Craigenputtock, but even in snowstorms there were compensations. Carlyle walked forth with his poodle Ponto observing the antics of the ravens and other fowls of the air, and Mrs. Carlyle peeped out in the moonlight when the enclosure before the house was literally filled with hares and when the scene was really very picturesque, "the little dark forms skipping and bounding over the white ground so witch-like." "A still more novel spectacle," she told Miss Stoddart, "exhibited itself at broad noon. Seven black cocks as *fine as ever stepped the streets of Greenock* came running to within a few yards of the door." There were books—a plethora of books—new books from London, and old books from Mr. Hunter Arundell's library at Barjarg. Friendly offices were not omitted. The cottagers in the glen had gifts bestowed on them and in the winter evenings Carlyle gave lessons in German to a divinity student living in a farm near by.

Froude represented Mrs. Carlyle to have been a down-trodden household drudge at Craigenputtock, and hints that her health was permanently broken by the privations she had to endure and by her husband's neglect of her. Nothing could be further from the truth. She enjoyed better health there than she ever did before or after, and had she remained there might never have had to resort to morphia and henbane. The alleged drudgery undergone by Mrs. Carlyle is as mythical as the injury to her health. "She baked the bread, she dressed the dinner or saw it dressed. She cleaned the rooms, she had charge of the dairy and poultry." Probably in a dilettante way, Mrs. Carlyle meddled in all these things, for the rôle of housewife was dear to her, by fits and starts, and she had been brought up to use her hands, but there was a servant and plenty of assistance from the farm, and no afternoon teas or dinner parties. "Among other of her accomplishments," groans Froude, "she had to learn to milk the cows." On that point let Carlyle speak. "That of milking the cows with her own little hands," he wrote, "I think could never have been necessary (plenty of milk hands within call), and I conclude must have had a spice of frolic or adventure in it. The saving charm of her life at Craigenputtock, which, to a young lady of her years, might have been so gloomy and vacant, was that of conquering the innumerable practical problems there." But besides practical problems there were lighter pursuits. She rode with her husband every fine morning; they read *Don Quixote* and *Tasso* together

in the evenings; she gathered flowers, galloped about the country on her own account and entertained guests. Let her tell her own story and confound her snivelling chroniclers. "Indeed Craigenputtock is no such frightful place as has been represented. I read and work and talk with my husband and am never weary. For my part I am content—I have everything here my heart desires. My husband is as good company as I could desire."

It was from Craigenputtock that no inconsiderable part of Carlyle's message to the world was issued. There German Romance reared its head; there *Sartor Resartus* was brought to birth, and there his lurid vision of the French Revolution first dawned on him, for the last thing he wrote there was *The Diamond Necklace*, that brilliant prelude to the great epic that was then rumbling in his brain. At Craigenputtock were written the essays on Burns, Johnson, Voltaire, Novalis, Cagliostro and that perturbing forecast *Signs of the Times*. A quick fermentation of his gifts took place there, yielding the rich and generous products of later years. The solemnity of the scene entered into his soul. On returning to it from London he drew a contrast between the life current of Fleet Street and the Whinstone mountains of Dumfriesshire, "where silence on her throne of Craggs over her empire of heath and bog rules supreme." Writing to De Quincey in 1828, he said, "In idle hours we sometimes project founding a sort of colony here. I reckon this is a much fitter site for such an establishment than your Lake Country. Would you come hither and be king over us? then indeed we

should have made a fair beginning and the Bog School might snap its fingers at the Lake School itself.”

Looking back on Craigenputtock years after he had left it, he wrote, “ I incline to think it the poor best place that could have been selected for the ripening into fixity and composure of anything useful that may have been in me against the years that were coming, and it is certain that, for living and thinking in, I have never since found a place in the world so favourable.”

It was at Craigenputtock that Carlyle was in his highest poetical vein. It was there he produced the translations of *Helena*, and *Luther's Psalm*, and there came *My Own Four Walls* and *The Sigh* among original compositions. The awe and reverence of the recluse sanctifying his sequestered home shine forth in these lines from *The Sigh*.

“ Lone stands our home amid the sullen moors,
 Its threshold by few friendly feet betrod ;
 Yet we are here, we two, still true though poor ;
 And this too is *the world*—the City of God !
 O'erhangs us not the infinitude of sky,
 Where all the starry lights revolve and shine ?
 Does not that universe within us lie
 And move—its Maker or itself divine ? ”

It was in the Craigenputtock time that a great trial befell him, in the illness and death at Dumfries of his sister Margaret, to whom he was tenderly attached, an event referred to in a letter revealing an intimate part of his nature that has been too much lost sight of by his biographers. “ For Margaret,” he wrote, “ we must not mourn. I think of her daily, hourly, not in sorrow

so much as in awe and love, and trust the Almighty may one day restore her to us and us to her: who knows but she may even now in some inscrutable mysterious way be near to us. We are spirits as well as she, and God is round us and in us Here as well as Yonder. Let us not weep for her but try rather to be wise and meek and humble as she was. . . . God is great. God is good; if it be His will, we shall meet again and part no more."

Like other places, Craigenputtock is lugubrious in bad weather. "I well remember," says Carlyle, "the gloom of our arrival back to Craigenputtock (after a joyous visit to the Jeffreys in Edinburgh), a miserable wet, windy November evening with the yellow leaves all flying about; and the sound of Brother Alick's stilling (who sometimes amused himself with smith-work with small purpose) click-clicking solitary through the blustering element. I said nothing, far was she from ever, in the like case, saying anything! Indeed I think we at once readjusted ourselves and went on diligently with the old degree of industry and satisfaction." But in the verdant spring, the golden summer, the purple autumn, Craigenputtock is rich in wild charm, and will well reward a pilgrimage to its grotto. The greatest talker of the Victorian age is no longer ministrant there, but it has a tongue of its own, the utterances of which will help to dissipate some of the ugly illusions about Carlyle and his wife conjured up by Froude and Geraldine Jewsbury and obsequiously repeated by succeeding scribblers.

THE DRAMA IN SCOTLAND

THE drama in Scotland, some may think, may be as summarily disposed of as snakes in Iceland by the simple formula "There is none." Some years ago, Sir George Douglas said that the drama in Scotland began with *The Gentle Shepherd* and ended with *Douglas* and consisted entirely of a beginning and an end, and although to-day, looking through *A Window in Thrums*, he might have to modify that statement and admit that the end is not yet, it must still be allowed that the dramatic literature of Scotland is small in bulk and meagre in merit. The prevailing Presbyterian faith, whatever benefits it may have conferred on the country, has not been conducive to the growth of the fine arts, and has inclined the people, not to theatre-going, but to funerals, which have always been, to the North of the Tweed, a popular kind of matinée, accompanied by matinée hats and costumes, and which have a special attractiveness of their own about them, as the particular performance in each case is unique and can never be repeated.

The strong anti-artistic prejudice of Scottish Presbyterianism, which has been especially inimical to architecture, sculpture, painting and the drama, was not, I think, of native origin, but of foreign importation. Long before the Reformation Scotland had given proof of its æsthetic qualities, and even of its dramatic tastes.

In the reigns of James IV and V, Sir David Lindsey, who died in 1490, had produced the *Three Estates*, a morality play, with comic and coarse interludes entitled *The Sowtar and the Taylour and their Wives* and *The Poor Man and the Pardoner*, which were performed for the amusement of the groundlings while the King, Queen and nobles were partaking of refreshments. The Reformation when it came of course arrested Thespian lucubrations, but it did not altogether abolish them. They still trickled on, for John Knox, who more than any man has moulded the opinions and sentiments, and coloured the national tastes of the Scottish people, was, strange to say, a patron of stage plays. Mr. James Melville, the minister of Anstruther, tells us that in 1676, when he was a student at St. Andrews, where John Knox was residing, at the close of his days but at the zenith of his power, "Mr. John Davidson, one of our regents at St. Leonard's College, maid a play, guhilk I saw played in the presence of Mr. Knox, wharin the Castle of Edinburgh was besiegit and taken, and the Captain, with twa or three with him, were hangit in effigie."

It was not therefore John Knox who thus patronised a sanguinary melodrama and who encouraged music and orchestral performances on the virginals, lute, githorn and pinalds, whatever they may be, who put the ban upon polite art in Scotland and made the country barren of beauty. It was, I fancy, the chilly avalanche of Calvinism from Geneva, that

"repressed its noble rage
And froze the genial current of its soul."

But, just as a new importation of zymotic disease spreads through a population with peculiar virulence, so this imported leaven of Calvinism rapidly fermented throughout broad Scotland and has left deep marks upon its character and countenance. All the arts languished under its blighting influence; every innocent enjoyment was reprobated, while the drama was regarded with pious horror, and the pit of a theatre as the visible orifice of the bottomless pit. In the beginning of the eighteenth century there was no theatre in Edinburgh, and Communion was refused to those who attended the performances of the strolling companies that occasionally visited it. In 1738 Allan Ramsay, anxious to add to his vocations of wigmaker, poet and librarian that of stage manager, opened a theatre in Carubber's Close, which was promptly closed by order of the clergy and magistrates. In 1752 the weavers of Glasgow destroyed the booth in which Love, Digges and Mrs. Ward were to appear for one night, and twelve years later an incensed crowd in the same city set fire to the temporary erection in which Mrs. Bellamy was to act. In the middle of the century public rebukes were administered in churches to persons who had ventured to witness the profane and dangerous entertainments of the stage, and at the same time Home was compelled to resign his living because he had written the tragedy of *Douglas*. Gradually, however, the old bigotry lost its hold. In 1764 a theatre was licensed in Edinburgh, and since then a progressive emancipation from the bonds of Puritanism has gone on, but at this very hour there is a large section

of the population in Scotland who still regard the theatre as a sink of iniquity; there are large numbers of Scotch ministers, big and little, who, although they may occasionally be seen at the Lyceum or Haymarket in London, would on no consideration enter the theatre of their county towns, even though the most celebrated and reputable actor of the day was performing there.

It is curious to note how, from under the dead weight of Puritanism, the dramatic instincts and predilections of the Scottish people have tended to break out whenever a crevice or margin of opportunity has presented itself. The genius of the people is, I believe, essentially dramatic. Predestination, which they have brooded on so deeply and so long, is the Greek Destiny in another form, representing the vain struggle of man against an eternal, inexorable fate, and a tragic interest has been imparted to the homely and somewhat cloistered life of the Scottish peasantry by the inner contest constantly going on between their stern theological tenets and the warm and tender emotions of their hearts. The ballads of the country sparkle with dramatic gems, and its literature (for example, the Waverley novels) glows with romance, with genuine comedy, with interludes of farce and broad humour. The repressive influence of Calvinism is, I think, brought home to us when we remember that of the lighter literature of Scotland, an amount, altogether disproportionate to their numbers, has been contributed by a small section of the Scottish people who have kept themselves free from Calvinistic restrictions—I mean the Scottish

Episcopalians—amongst whom we must number the Rev. John Skinner, author of *Tullochgorum*, Lady Jane Lindsay, who wrote *Auld Robin Gray*, Lady Nairne, Sir Walter Scott, John Gibson Lockhart, Professor Aytoun, Principal Sharpe, Dean Ramsay and many others. Then amongst Scottish writers reared in the Presbyterian faith we observe a tendency to drop into the dramatic whenever they shake off their early Calvinistic swaddling bands. Smollett in 1757 wrote *The Reprisal, or the Tars of Old England*, in which sailors are drawn to the life, while every species of national prejudice against the French is called up and appealed to. The play was produced by Garrick to stimulate patriotic sentiment. Henry Mackenzie, the biographer of Home, was responsible for a tragedy, *The Spanish Father*, which was never produced because the catastrophe was of too shocking a description, and a comedy, *The White Hypocrite* which was performed at Covent Garden. Jemmie Thomson, when he got up to London, wrote *The Masque of Alfred*, *Sophonisba* and *Tancred and Sigismunda* and a tragedy called *Coriolanus* also. Sir Walter Scott's *House of Aspen*, although it never got further than the rehearsal stage, is not to be forgotten, and it is also to be borne in mind that Johanna Baillie, of pure Scottish blood and reared in Lanarkshire, poured forth three series of plays on the passions, while her tragedy of *De Montfort*, when produced by Kemble at Drury Lane with Mrs. Siddons in the chief rôle, ran for eleven weeks. And Burns, when he had finally broken with the local Presbyteries,

produced his dramatic fragment *The Jolly Beggars*, which Carlyle has pronounced the most poetical, harmonious and vivid of all his works. Oh! that he had been spared to pursue this vein and give us a truly native and noble Scottish drama.

The innate dramatic qualities of the Scottish people are also, I think, exhibited in the critical acumen they display whenever they have emancipated themselves from anti-dramatic prejudice. For a great part of the last century, I believe, an Edinburgh audience was considered by our leading actors to be the most discerning, appreciative and stringent in judgment of any in the United Kingdom. That may not perhaps be so now, when the best part of Edinburgh is in London, but still our Scottish theatre-goers are, I fancy, not lacking in discrimination.

The drama has, I think, retaliated on Scotland for whatever drawbacks and indignities it may have encountered in that country, for the Scotchman is invariably represented in the English drama in a somewhat odious and contemptible light. The stage Irishman is invariably amusing and delightful, overflowing with fun and frolic, with a dash of chivalry in him, but the stage Scotchman is a shaggy, raw-boned compound of meanness, hypocrisy and the whisky habit. As a patriotic Scotchman, I object to have my countrymen represented by Sir Pertinax Macsycophant in *The Man of the World*, or by Sir Archie Macsarcasm in *Love à la Mode*, and I call on our dramatic authors of the future to do justice to Scotland in this matter.

We often hear of the influence of the drama on morals and conduct, and I have no doubt as to the existence and potency of that influence, nor do I doubt that on the whole it has been and is salutary, but it is somewhat difficult to trace out. It is in the main a stream of tendency, and when one is challenged it is not easy to adduce particular instances of it.

Now it so happens that on looking back on the history of the drama in Scotland I am able to quote a concrete and conclusive instance of this influence.

During the latter part of the eighteenth century the pernicious practice of giving vails or presents was firmly established both in England and Scotland, and had become a grievous burden to many. The impecunious author could not dine with his noble patron, or the half-starved and full-quivered curate with his bishop, without leaving behind him a guinea in the hands of pampered menials much richer than himself, and was sometimes in consequence obliged to pawn his watch, if he had one, or do without dinner for a week to defray the expense of sitting at his lordship's table for an hour. The departing guest had to run the gauntlet of a row of expectant men in livery, and two or three guineas was a common sum—ten guineas not an uncommon one—to leave with footmen after being entertained at a great man's house.

Well, the abolition of this most obnoxious system in Scotland was entirely due to theatrical influence. When Townley's farce *High Life Below Stairs* was being performed in Edinburgh in 1769, the footmen who

were allowed to frequent the gallery free while their masters sat in the boxes were filled with resentment at the ridicule cast on their ways, pretensions and extortions. They presented a threatening letter to the manager, Mr. Love, who next night coolly read it from the stage. The footmen disturbed the play by their din and noise, on which they were forcibly ejected from the theatre, and from that hour the privilege of free admission was withdrawn from them. It was this incident which led the gentlemen of Scotland to rebel against the system of vails and resolve that they would tolerate it no longer, preferring rather to give higher wages to their servants than to allow them to sponge on the liberality of their friends and so restrict social intercourse. The gentlemen of Aberdeenshire and Midlothian and members of the Bar—men connected with the best families in the country—bound themselves no longer to allow their servants to receive guest-money; and the resolution was carried out with such determination that the rapacious practice was at once put an end to. Not so in England. Though, following the example of the Scottish gentry, the grand juries of Northumberland and Wilts pledged themselves to discourage the giving of tips—the power of flunkeydom and fashionable prodigality proved too much for them, and the vail system has always continued to hold sway in England, and has, with the sporting fraternity, again invaded Scotland and taken possession of it to an alarming extent. I much wish the theatre would again intervene. I am afraid the Lackey Carnival

does not touch this topic. I have no personal interest in the matter—as I have never seen a gamekeeper that I know of—but I should greatly like to see my country cleansed of an abominable system that demoralises rich men and makes poor ones uncomfortable.

One other instance of the practical utility of the drama in connection with its career in Scotland occurs to me, and that is that it was there that the drama was first enlisted in the treatment of mental disease. In the year 1840, in the face of much opposition and ridicule, my father had a small theatre constructed at the Crichton Royal Institution, Dumfries—the first piece performed, if I recollect aright, being *Raising the Wind*, and ever since then dramatic performances have had a recognised place in ministering to the mind diseased, in plucking from the memory its rooted sorrows and in razing out the written troubles of the brain.

I recollect Mr. Buckstone telling, I think it was at a dinner of the Royal Theatrical Fund, that when a young man he had played for a week with a travelling company at the Theatre Royal, Dumfries, for the first four nights under very depressing circumstances, to “a beggarly account of empty boxes.” But on the Friday night a change suddenly came over the spirit of the scene. Half a dozen boxes were filled with ladies and gentlemen, who received him well, took all his points and gave him rapturous applause. Upon getting behind the scenes he said to the manager with a triumphant smile, “At last, sir, my talents are recognised.”

To which the manager replied, "Don't flatter yourself too much! When we are not doing a big business the doctor at the neighbouring asylum takes a part of the house, and these ladies and gentlemen who have received you so well are all lunatics."

